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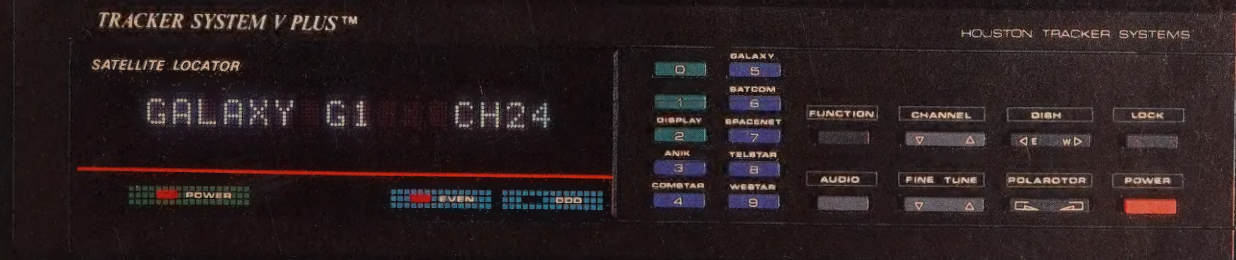
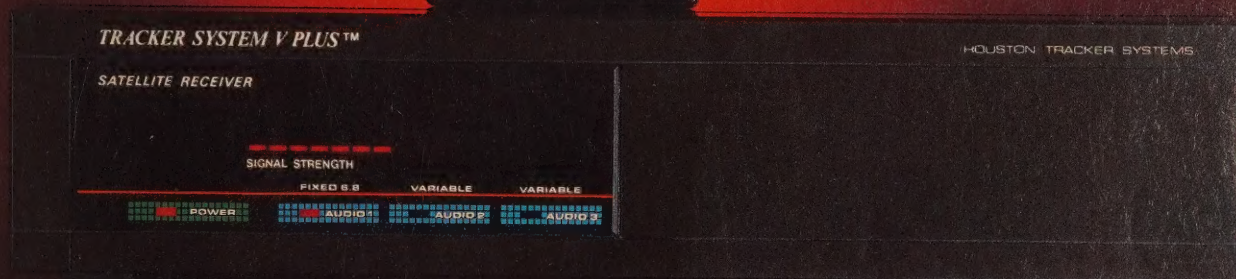
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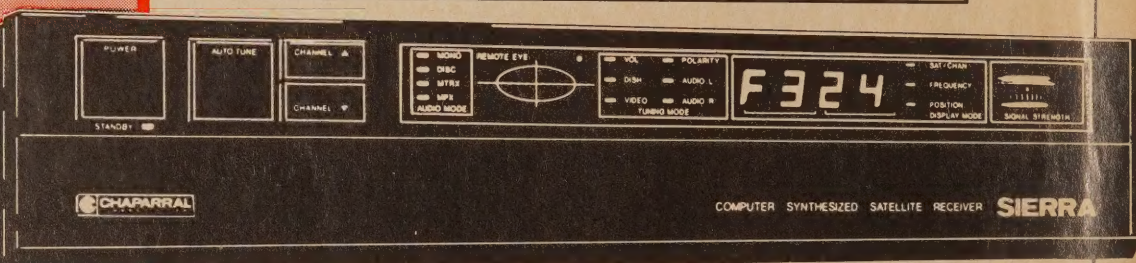
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He Created Home Satellite Viewing

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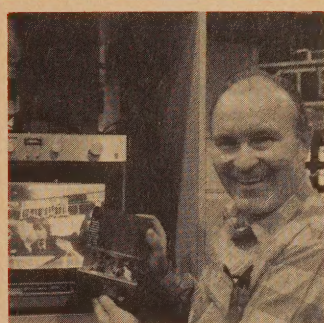
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Home Satellite TV

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One of the most common complaints in this field is that systems are improperly installed. "My dish won't track! The wiring shorts out when it rains! The mount broke during the last windstorm!"

It's a simple but true fact that no matter how expensive a system you buy, it can all be wasted by an improper installation. Sometimes it's not the size of the dish or the quality of the receiver that counts the most—it's the ability of the installer.

Good installers are quick, efficient and the resulting picture is a pleasure to watch. When we recently updated our system (see accompanying article), I watched the installers carefully. They did a new site analysis for TI. They scrutinized our roof so that the mount was absolutely secure. They never forgot to go back and torque a bolt. They sealed all openings and made certain the electrical connections were fully insulated. They checked the inclination and declination carefully when setting up the antenna. (Perhaps that's why we got a picture on the first try and the dish was aligned with the satellite belt in less than 30 minutes!)

Getting the right installers is vital. At minimum they should have taken the SPACE administered installation course. Also try to get your dealer to introduce you to your installers. Find out how much experience they have, what they're background is.

In the past this was a field of amateurs. Now it's maturing with many competent people out there. Be sure you get a professional.

Bob Wolenik
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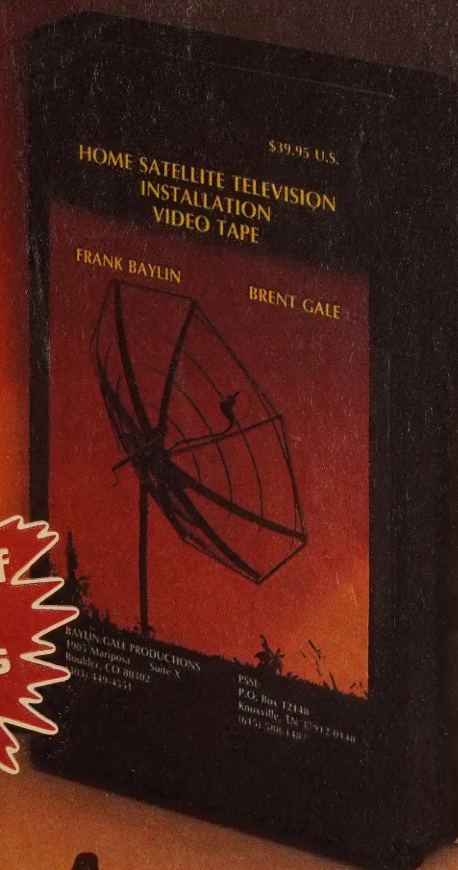
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HBO GOES CONSUMER DIRECT

Where does the cable tv industry stand on sale of services to Earth-station owners? Recently, an employee of one of the larger cable companies has informed me of a study being carried out by his employer to determine the level and location of satellite earth station sales. The marketing study is simplicity itself. The company offered the employee and his co-workers one dollar for each address of any home or business which sported a satellite dish. In the course of his travels while running errands or shopping, he could earn hundreds of dollars in his spare time. It sounds like an ad-

vertisement in a career magazine. It beats collecting soda pop bottles. With the type of response one would expect from this scheme, and with a computerized data sharing system, the cable industry could soon know more about the satellite industry's level of market penetration than the industry knows about itself. What better way to develop a list of potential customers for scrambled channels and decoder boxes?

Some of the cable carriers have already tried to capitalize on this market, but the cable industry itself has run up against HBO's stone wall of marketing policies. HBO has worked hard to build

a monopoly on encrypted signals and, understandably, it wants to squeeze out all the profit it can before competition moves in. It appears that it considers its own cable franchises to be competition if they step outside the geographical boundaries of their franchised areas.

In the beginning, HBO's official story was that it wanted its cable affiliates to be the only dealers for the decoders and the sale of scrambled signal subscriptions. Satellite dealers cannot sell the subscription service and obtain commissions on sales. The homeowner must contact the nearest cable company or contact HBO directly and pay the inflated price of \$12.95 per month for the service. The fact is that HBO wants it all. And it seems to be writing and rewriting the rules as it goes along.

In spite of its advertised procedure, HBO has even refused to sell the subscription through the local cable franchise in certain circumstances. HBO

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Let's face facts. If your current receiver line won't let you choose intelligent options and features *affordably*, maybe it's time to change receivers.

now demands that any subscription be accompanied by the name and address of the dish owner. If that address is outside the cable service area, then HBO will not sell through the cable company, but will insist on going direct to the consumer.

I recently spoke to a small cable operator who had been selling HBO for \$6.75 per month with decoders at cost. His theory is that the earth station owners cost him less to service than his cable customers because he has no cable or headend maintenance or installation costs and therefore he could pass these savings along to the dish owner. His own franchise is in a rural area where cable service was not available to many potential customers, and the response was good. Before attending the SPACE/STTI show in Las Vegas, he had also contacted other cable dealers who did not want to handle the decoders or bother with the dish owners and did not mind if he sold

this type of service to existing dish owners in their franchise areas.

At the Las Vegas industry show, the cable operator handed out leaflets offering HBO subscriptions at the much-reduced price of \$6.75 per month. Bob Cooper caused this information to be released on the satellite channel. The response was instantaneous and dramatic. Back home that same day, calls came in from all across the country. When he contacted HBO to obtain authorization to install decoders and sell the subscription service in the non-franchised areas, he was told by a senior vice president of the corporation that HBO would only allow him to sell in his own franchise area and that HBO wanted all the business in the rest of the country for itself at full retail price. Bear in mind that at this time he was not attempting to sell in other franchised areas, but only in areas where cable was not available. HBO insists that homeowners in non-franchised areas

must now deal directly with HBO and pay the artificially high advertised prices directly to HBO. Furthermore, the cable operator would not be allowed to sell in other franchised areas even if the owners of the franchises had no objection and did not intend to service the dish owners themselves. Customers in such areas must also buy direct from HBO at full retail prices. HBO is acting to prevent competition which could lower the subscription price to a commercially reasonable level by denying access to the product.

Other companies have gone to the consumer direct in their sales and marketing plans, but few have had the control over the product that scrambling has given HBO. In passing the 1984 Satellite rights act, the legislators seem to have believed that the marketplace, through competition, would ultimately determine the reasonable price for the service. If left to itself, the marketplace

Continued on page 80

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HE CREATED HOME SATELLITE VIEWING

*Taylor Howard Has Led
The TVRO World From The Beginning*

BY BOB WOLENIK

If you ask the average satellite TV viewer, the one who watches baseball games or movies or just plain soaps, "Who put up the first home satellite receiver," you'd probably draw a blank. One person I asked replied, "You mean there was a first receiver? I thought it all just sprang up at once!"

Yes, there was a first receiver and a man who built it. He also happens to be the man who founded and is the current Chairman of SPACE (Society for Private and Commercial Earth Stations). And he is a founder and director of Chaparral Communications, a leading satellite hardware manufacturer. And he's a professor of engineering at Stanford University. And he's a project director for NASA.

Can one person be all of these things? The answer is yes, if that person is Taylor Howard.

Taylor Howard is an energetic, robust man who is known for his great optimism. When asked about his tendency to

look on the sunny side of things, he just shrugs, apparently reminding himself of the great many times he has been correct, while others, more pessimistic, have not.

One of the first things anyone talks to Taylor about seems to be his first TVRO system. In fact, in contributing an article for the co-founder of this field, Bob Cooper, back in 1984, Taylor put together the following blow-by-blow account of the first installation:

May 21 (1976) - Poured slab to get flat spot to work on.

June 24-30 - Poured antenna footing

July 1 - Brought 15 foot dish to home (Mark products 900 MHz aluminum tube maze)

July 4 - Marry Annie, went on honeymoon (little did she know!)

July 28 - Dish is up! Put it on SP 1M pedestal (built by GE in 1942 for first mobile, S band radar.)

Sept. 14 - First picture!. All red background with white lettering which said, "Attention All Earth Stations" and was followed by orbit information.

What Taylor neglects to mention is that he built this first home satellite receiver all out of spare parts rummaged from here and there. Prior to this, no one thought it was possible to build a home system.

When word got out that about what Taylor had done, others immediately began to build their own systems. Taylor says that he was barraged with requests for information, so much so that he put out a xeroxed "book" called, *A Low Cost Satellite TV Receiving System*. It told how to build a home satellite receiver—not just where to get one, but how to build one with parts bought at local electronics stores! The manual was redone with Bob Cooper's help and pub-

Looking To The Future - Taylor Howard started the field with Bob Cooper (below) when they installed the first home satellite systems. Today, Howard as a Director of Chaparral Communications and as Chairman of SPACE is waging war against scrambling and for quality equipment.

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Taylor Howard

Continued from page 11

lished as "The Howard Terminal Manual." Some 6,000 copies have been sold to date! With his manual you could build a receiver system right from the ground up.

Shortly thereafter, with Bob Taggart, a mechanical engineer, Taylor founded Chaparral Communications. Actually, the company had first been envisioned by Taggart who, back in 1968, founded it as an antenna manufacturer. When things didn't work out, he closed it down, later to resurrect it with Taylor as a communications concern. Chaparral today is a leading manufacturer of LNA/LNB, feedhorns, and home satellite receiving systems.

Of course, Taylor didn't spend all of his time at Chaparral. He spent a great deal of time working for NASA on the Apollo and Mariner programs. He is presently radio team leader on the Galileo flight to Jupiter.

But Taylor's real contribution to this field came about when he became founding president of SPACE in 1980. He was worked diligently for the organization since that time and is currently Chairman of the Board.

Taylor Howard is an outspoken representative of the home satellite field. His comments are sought after and his predictions frequently come true. Here's what he has to say about the current state of home satellite reception:

ABOUT HOME SATELLITE AND THE CABLE OPERATIONS

We are presently in a serious battle with Cable, one that will be fought through legislation, litigation and in the marketplace. The Cable industry, in a desperate struggle for its own growth and survival seems to think it should control all the video in the world.

The idea of the cable industry supply video to the satellite dish owner is, simply, wrong. If I want to buy something, I go to the person who owns it and make an offer. Many things are subject to brokering or a distribution chain where the middleman adds value to the product or performs a service. Cable has no value to add—only cost. Cable says the video is theirs—baloney! The video belongs to those who produce it and they should be anxious to serve our market in a way that optimizes their revenues and not through a mechanism to protect an irrelevant middleman, Cable, which has incentives to keep prices high.

Remember, Cable has been deregulated and will soon be able to do anything it wants with prices unless we are there to provide price competition!

ABOUT FREE PROGRAMMING

From the prattle of some talk show hosts to the dealer who advertises that it will be free and there will never be scrambling, we have begun to get back the pirates and thieves image which SPACE had reversed through legal and legislative action and the stated goal of entering the mainstream.

I have found that the difficulty with this group (those who advocate free programming) is that they are uninformed and know nothing of the history, the law or the actual business facts. They tend to feel that since it comes from the sky, and the taxpayer shouldered the burden of developing space technology, no profit making business can be conducted. They ignore the fact that all of the communications satellite are built with private funds and many of them are launched

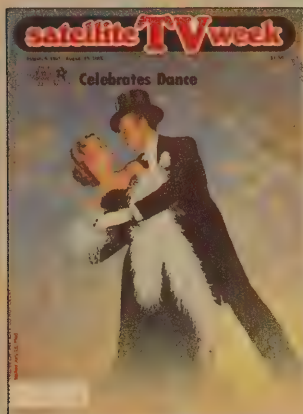
Continued on page 14



Doing It Himself - Howard is scientist, inventor and handyman. Here he makes final adjustments to feedhorn.

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If we view programming, we need to pay for it. Free is not the American way. Move to Russia if you want free programming.

ON ADVERTISING SUPPORTED SATELLITE TV

There is another common misconception, one that advertising will support home satellite TV. (This is the "Let someone else pay theory.") That might have been true if DBS had survived... The trouble with cable and particularly with satellite direct to the home is that there are too many channels for that type of support. There is not enough advertising money in the world to fund 150 or more full time video channels. One only has to tune through them to find out how some are supported: some ask for donations, others sell something, the superstations have advertising, and a couple will sell you a decoder and a monthly subscription.

ON SCRAMBLING

Richard Brown, myself and others foresaw the problems of scrambling as far back as 1980. However, what we did not foresee was the abruptness with which it came about. We figured the field would grow more before it happened and that it would be a smoother transition.

I think that one of the good things that has happened in this area is the entrance of Showtime to scrambling. Now we have competition between the two premium channels. This can only benefit home satellite viewing by ultimately driving the price of the programming down.

A HOME FOR HOME SATELLITE TELEVISION

Is home satellite TV in the mainstream? Before television there was no stream, just movies. At one time it was thought that TV would kill the movie industry and other times cable and VCRs were potential murderers. Now they all coexist and have grown beyond everyone's wildest dreams. Satellite TV has muddied their waters and, like the VCR, will be a target for much unpleasantness until such time that the money is flowing to those who provide the video.

LOOKING TO THE FUTURE

These are difficult times for many in this industry. We simply won't have the muscle to get our way until we have an installed base of 5 to 10 million viewers. Until then we are vulnerable.

I expect to see significant changes in the field in the next few months, including a turnaround. I believe that there will be many successful dealers who will survive and thrive. They are the ones who will work out agreements with local cable companies, keep informed about the changing scrambling environment, and be ready to move into the "video made specially for TVRO" future. They will do the hardware, the cable companies will supply the decoders and software. After all, cable operators are smart people. They'll quickly see the advantages of getting part of the home satellite TV action. Consumers are price and quality conscious. When they see that they can get a good deal with a home satellite system, things will come out all right.

I think that for us as an industry, this is a watershed time. The Congressional hearings (held last March) helped to fo-



150 Foot Dish - Howard (right) and Roy Long stand in front of the enormous antenna at Stanford University holding the "SR1" receiver from the space program's Pioneer spacecraft.

cus attention on the tactics and abuses of the cable people. At those hearings I would say that the score came out, "Lions - 0, Christians - 3!" Those hearings gave us a boost both in Congress and in the field. I think we're going to see that boost continue with strong progress in the future. ♣

Editor's note: The preceding article was prepared from exclusive interviews with Taylor Howard and from prepared speeches that Mr. Howard has delivered.

EARTH STATION OWNERS

Protect Your Viewing Rights



Join SPACE, the satellite television industry association, to demonstrate to Congress your support of legislation which will guarantee access to scrambled satellite programming at reasonable fees.

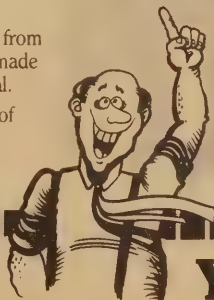
We Need Each Other

We need each other now to help ensure that programmers are not coerced by the cable industry to scramble.

From 1980-1983, manufacturers, distributors, dealers and consumers—through SPACE—prevented four bills from passing in Congress that would have made the use of satellite earth stations illegal.

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Broadcasting To DISH OWNERS Only

How You Can Stay On Top Of The Latest Happenings

BY TIM HARRINGTON

The international network of satellites is the most advanced communications system in the world and is fulfilling man's dream of access to electronic communications regardless of where he may live. So it naturally follows that this technology should be utilized by the home satellite TV industry to help advance and stimulate its own growth.

The development of satellite TV technology has evolved at an amazing rate, with which the United States legal and legislative system has not been able to keep pace. It is because of this that it is difficult for most people to have a comfortable feeling that they are really aware of the specific status of the industry at any given moment. The answer to this is open forums for the industry and the public to exchange ideas, strategies and tactics to move the industry ahead. These relatively new satellite TV industry shows provide extremely important forums which will continue to play a critically important role in coordinating the efforts of everyone involved in the industry.

A number of satellite TV industry dealer and consumer oriented shows have appeared in the last two years to communicate the up-to-the-minute goings on of the fast paced evolution of the home satellite TV industry. As a consumer you may find them very interesting and if you are directly involved in the industry, weekly viewing of one or more of the shows is a must.

While all of the shows have similar objectives, they vary in format, content and personality. They all have humble beginnings as a result of limited initial budgets, staffing and experience, but they continue to mature and for the most part offer useful and sometimes significant information and insight into the satellite TV industry.

SPACE/SHOWTIME

Nova Video Productions initiated the satellite industry show concept in March, 1984 and since then new shows have continued to appear. SPACE (Society for Private And Commercial Earth stations) joined forces with Nova Video Productions in December 1985 to further strengthen the show's content, financial foundation and overall credibility. This show does a good job of blending studio interviews with key figures of the industry along with ventures into the field to cover satellite TV trade shows and other events.

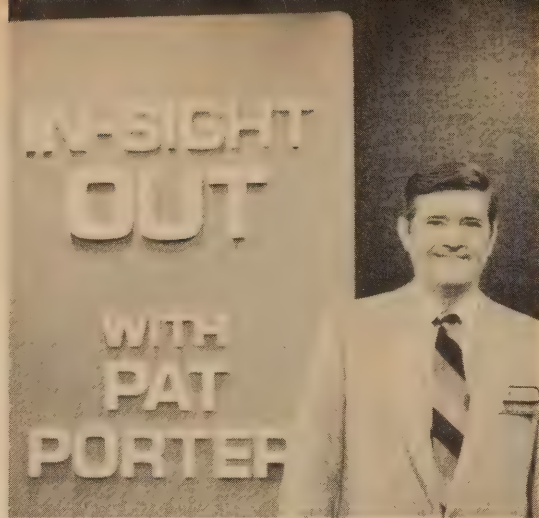
Nova Video Productions and SPACE present "SPACE/Showtime" on Spacenet 1, Channel 17 every Tuesday at 9:00 p.m. Eastern time with a repeat show on Wednesday at 12 noon. Pat Olson (anchor) and Joe Boyle (of SPACE) present current information on the satellite industry, including the latest on the Washington scene. You can stay informed on key issues and legislation concerning scrambling, zoning, etc. by tuning in each week. Interviews, commentaries and special features are also presented by Joe Koelsch and Bob Cooper.

I especially enjoy the show's coverage of trade shows which includes interviews with executives from satellite TV component manufacturers discussing their products and offering their views on the industry. Bob Cooper is a professional scooper and "insider" who is capable not only of ferreting out significant developments in the industry, but also getting people to say really humorous and insightful things in front of the camera. A certain cable operator was selling HBO to home dish owners at a substantial discount and while talking to Bob commented, "Yeah, that's about all it's worth."

For those interested in the technical side of the business,

Continued on page 18

Insight, Information and Entertainment - High-tech shows provide it all to the home satellite viewer. At top is a control room during pre-production planning while below, Al Bond, Tim Hodgekins and Father Vito Sarducci chat on the set of Satellite Forum.



In-Sight Out - Pat Porter brings humor and commentary to the show.



Earth Station Day - Broadcast came from a temporary studio in Washington.

Dish Owners

Mike Gustafson reviews products and gives you those handy tips to keep your system performing at its best. To round out the show, Pat Porter is there with his special brand of humor to keep things on the light side. Although a jester at times, Pat offers a lot of down-to-earth wisdom between his lines.

SPACE/Showtime receives part of its revenue for operating costs from advertisers, such as STV Magazine, Kaultronics and Luxor North America. The show is produced alternating weeks in Richland Center, Wisconsin and Washington, D.C. and uplinked in Washington, D.C.

BORESIGHT

Boresight began as a dealer oriented show and slowly evolved into a general industry show for both insiders and consumers. The purpose of the show is to provide a communications base for the industry by keeping dealers and system owners informed about all aspects of the evolution of satellite TV.

The show follows a magazine format in the 20/20 style, with Shaun Kenny, Karen Howes, Susan Kennedy and Bob Cooper reporting on the industry. Produced in Piscataway, New Jersey and uplinked in Northvale, New Jersey by Atlantic Satellite, the show airs on Thursdays at 9:00 p.m. Eastern time on Spacenet 1, Channel 7. The major advertisers are ESP, Probrand and Maxum.

Boresight has matured with experience, but I miss some of the old segments that are probably just as well gone. During early days of satellite TV, the overall quality of a lot of satellite TV equipment left much to be desired and it was difficult for new, inexperienced dealers to sort out the good manufacturers from the bad. Shaun Kenny used to pull no punches with his "butcher block" segment. In it where he would take a sledge hammer to one of the "best" of the worst receivers or other TVRO products each week as a public demonstration of his disgust with that particular product. As you can guess, this segment was, to put it mildly, controversial, especially if you were the manufacturer of one of the pieces he destroyed. While the overall fairness could at sometimes be questioned, it did get the attention of some manufacturers that could stand to improve their overall quality control and customer support.

This show also does a good job of covering the industry trade shows and gives an insight that most consumers could not get because trade shows are open to and cater only to dealers, distributors and manufacturers. Coverage of the trade shows is important because the industry is still relatively small and consumer support, especially politically, is very important.

Boresight also aired Techline, a live 2 hour show highlighting a technical topic each week. It is currently off the air, but plans for its return in the next few months are being made. Future plans for Boresight are to continue industry related communications and possibly also do some of their own programming. They want to utilize the satellite network, where time is inexpensive, to produce programming for other people.

SATELLITE FORUM

Produced and uplinked in Dallas, Texas since August, 1985, you can find a Satellite Forum every Sunday night, 10:00 pm Eastern Time on Westar 5, channel 21. The newest entry in this field, Satellite Forum is a little different in its format. First it is virtually all live with the exception of taped commercials which are inserted during the show. The show accurately bills itself as a live variety talk show dedicated to the satellite TV industry.

Regulars on the show include Al Bond, host and Tim Hotchkin, Executive Producer. Tim presents a weekly segment called "My Dish" where a photo of an interesting dish installation is selected and featured each week from the hundreds that are sent in.

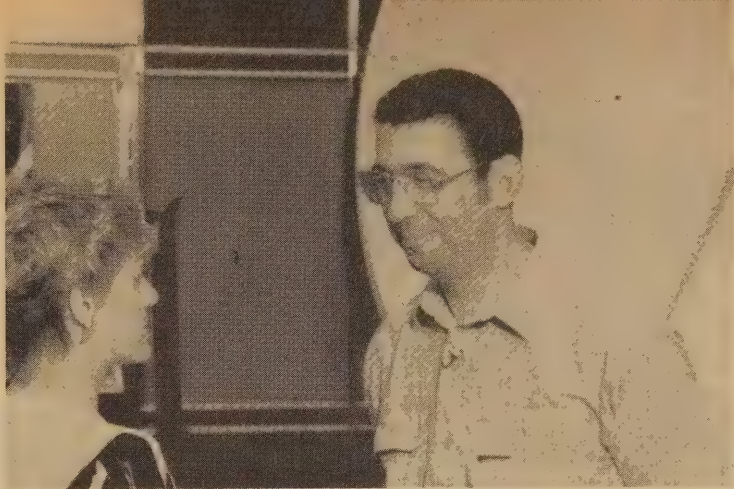
Another regular, or in this case "irregular," is Father Vito Sarducci. He is Guido's long lost brother and in my opinion, I think they are one and the same guy. Father Sarducci offers his own unique views and critiques for the satellite TV industry.

One of the important aspects of Satellite Forum is that viewers can call in with questions or comments. This participation helps to make this show a success because the discussion is wide open and tends to add to the overall interest and appeal of the show. During the live show they receive calls from all over the country.

Tim Hodgekins says that their viewing audience has increased dramatically over the past few months and includes a very large segment of active satellite TV dealers as well as



America - Keith Lamonica fans the flames controversy on Audio only.



Space - Showtime - Anchor Pat Olson talks to program contributor, Bob Cooper.

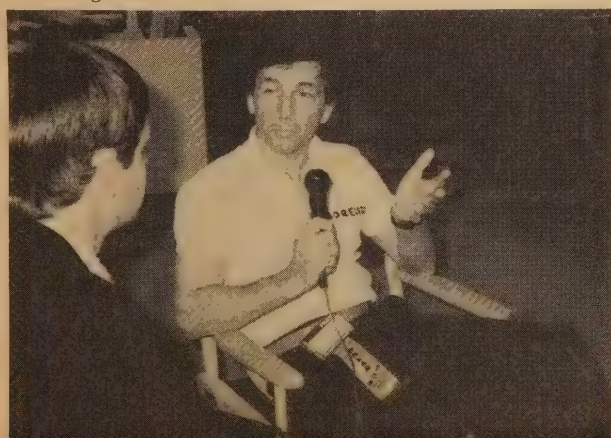
consumers. His goal, along with Dave Axline, Co-executive Producer, is to support the satellite industry by offering a weekly video conference type show with the participation of dealers all over the United States, Canada, Mexico and the South Pacific.

Tim's future plans for the show include expanding the format to include interviews with industry related individuals on site and out of the studio and interviews with consumer dish owners in their homes. He is also interested in finding and offering a buying service for industry related products that are sometimes difficult for dealers and especially consumers to find.

AUDIO ONLY TALK SHOWS

Another type of show becoming popular is the call-in talk show with essentially the same style as radio call-in talk shows. Usually the moderator will begin the show by discussing a particular topic that is on his or her mind and will then open the phone lines for listeners to call in and comment. From time to time a caller will bring up a point that will change the direction of the show's focus and other times the moderator will change the direction when he feels that the topic is either 'talked out' or losing the interest of the general audience. Keith Lamonica of FM America is probably the best known moderator of this genre and has developed a following of listeners with his outspoken style and sometimes controversial views on the industry.

Boresight - Host Shaun Kenny at one time evaluated the performance of virtually all the new products in his "butcher block" segment.



THE SIGNIFICANCE OF SATELLITE INDUSTRY SHOWS

Satellite TV can provide diverse educational, informative and entertaining programming regardless of where someone lives. To lose sight of the significance of the potential positive social and economic impact of this technology is to lose sight of the incredible opportunity that it offers our country. Make no mistake about it, satellite TV is threatened by a well entrenched cable industry that is doing its best to inhibit and stifle the growth of this new technology. Cable delivered programming is an intermediate technology that has and will continue to lose a significant number of its customers to satellite delivered programming. It is in the overall best interest of our country that this wonderful new technology be allowed to develop in an open free market environment. These shows will continue to help coordinate the efforts of all interested parties in making sure that this happens.

Boresight

Thursdays, 9 pm Eastern, Space-net 1, channel 7

Satellite Forum

Sundays, 9 pm Eastern, Westar 5, channel 18

SPACE/Showtime

Tuesdays, 9 pm Eastern, Space-net 1, channel 17. Repeated Wednesdays 12 Noon Eastern.

AUDIO ONLY SHOWS

FM AMERICA

Nightly 9 pm-12 am Eastern, Telstar 3 channel 18 (6.2/6.8 audio only)

North America One

Daily, 12 pm-6 am Eastern (7.56 audio only)

Home Satellite Chit Chat

Sundays 12 Midnight Eastern, Satcom F4 channel 24

The times, satellites and channels where these shows are located are subject to change, so it is advisable to check your programming guide.

Living With Scrambling

YOU CAN'T KEEP A GOOD TECHNOLOGY DOWN

There's Just Too Much Know-How In The Satellite World

Is there life after scrambling? What's the worst thing that could happen if you owned a home satellite TV system? Logically one might guess: a hurricane which crushed the dish, or a power surge which fried the receiver or a picture tube which suddenly went dead. Maybe. But for most viewers, the most dreaded thing, at least from an emotional viewpoint, is scrambling. One viewer commented, "Scrambling is like dying! It's the end of my system!"

Well, scrambling has happened. Last January, HBO and Cinemax began fulltime scrambling. In early March, Showtime and the Movie Channel announced their scrambling plans. And you know what? Nobody has died.

***Some cable operators
tried to offer BOTH
HBO and Cinemax
to satellite TV viewers
for \$11.75!***

In fact many (most?) home satellite TV viewers didn't even notice. With over 100 channels to choose from (many of those broadcasting movies), it's hard to really feel the impact when a half dozen or so do scramble.

Nevertheless, the gauntlet has been thrown. While scrambling may now be nothing more than a minor thorn in the side, what about the future? The real question, particularly for those who are considering buying a system, is, "Will everything eventually be scrambled? Will I be able to see enough to justify buying a system?"

The threat is there. Other channels, including ESPN have talked about scrambling. CBS is making the motions of moving toward it to protect its affiliates. NBC and ABC are watching closely. Is it possible that sometime in the not too distant future, the sky could actually go dark? Could there be few, if any, unscrambled channels?

THE TWO REAL ISSUES

At this point, the issue often gets clouded by hysterical comments. Some run around wringing their hands shouting, "The sky is falling!" Others begin taking up shotguns to, "Defend the American way of free TV!"

Putting emotion aside, however, a

candid and realistic appraisal indicates that there are two basic issues involved and that scrambling is only the symptom.

The first issue is that of paying the programmers. Johnny Carson isn't going to do the *Tonight* show for free. Hollywood isn't going to turn out movies that cost millions to make and then offer them free to the public out of the generosity of its heart. Newscasters and news broadcasting staffs aren't going to devote their lives to keeping us up-to-date without compensation to them. So it is with *all* programming.

Money makes programming work. If we want to get programming, one way or another we need to pay for it.

Continued on page 22

Home-made Descrambler - Inventor and scientist Keith Anderson disliked scrambling so much he decided to see if he couldn't do something about it. The result was the \$10 box in his hand. It descrambles HBO, Cinemax and a host of other programs. (It only descrambles the video on HBO and Cinemax, but Keith says he's working on that little problem.)



Technology

Paying, in fact, is what scrambling is all about. With a cable system, the viewer pays the cable company who in turn pays the programmer. No pay, the picture gets turned off. With a home satellite system, however, it's different. If the viewer doesn't pay, how does the programmer turn off the picture. The answer is scrambling. No pay, the picture gets scrambled. Scrambling really means that the programmer is saying, "Pay or you don't get to see it."

Thus, scrambling permits programmers to get paid and allows us to see their programming. (There are other methods than scrambling, of course. Advertising sponsored programming where the sponsor is an alternative.)

If this were all there was to it, then scrambling would not even be an issue today. The programmers would scramble, offer descramblers at a next to nothing price (to get viewers) and then charge a nominal monthly fee. (HBO, for example, charges cable operators under \$4 a month for each viewer they have.) If it were only a matter of dealing with the programmers alone, the means to provide adequate and fair descrambling would surely have long ago been resolved.

The problem and the second issue, however, are the cable operators. They have their own axe to grind.

Operating a cable system is a highly lucrative business. Once the cable lines are in, except for occasional maintenance all the operator does is sit back and wait as the money rolls in. It's sort of like being a utility company.

This is particularly the case when it comes to the premium channels. Many cable operators, for example, charge viewers \$10 a month for HBO or Cinemax. Considering that they are paying less than half of that to receive the programming and considering that it costs them almost nothing to put that signal out over existing lines, the profit incentive is great.

Then along came home satellite viewers. This group doesn't need the cable. It doesn't need the cable operators. It can get the signal direct from the satellites (the way the cable operators do). It can potentially deal directly with HBO and the other programmers who want to scramble. Suddenly, there's no real need for the once lucrative cable business.

Cable operators are more than a little concerned. They have seen the home satellite challenge as a direct



KEITH'S \$10 BOX

Keith Anderson is the founder of Anderson Scientific, the well-known manufacturer of home satellite receivers and accessories. He is basically an inventor and a scientist. He is also one who fervently dislikes scrambling.

Mr. Anderson so dislikes scrambling that he set out just to see if he could break the M/A-Com VideoCipher system. As it turns out, he says he did so and in record time.

Anderson now has his own "black box." It consists of parts which he had around and which he values at about \$10. "If you go to an electronics store and buy the parts, it might cost upwards of \$15!" he comments.

Anderson's box tunes in HBO and Cinemax and even other scrambled channels. The picture is perfect. The sound is another matter. As Bob Cooper, one of the founders of the home satellite field points out, "M/A-Com's video scrambling is soft—likely to be broken. It's audio, however, is hard. It may never be broken." Anderson acknowledges the problem, but points out, "I'm working on it!" He also notes that his little black box will descramble *both* video and audio from other encoding systems.

When asked if he planned to manufacture and sell his black box, Anderson pointed out that to do so would probably be illegal. In fact, he doesn't watch any of the channels he descrambles using his device; he just built it as a scientific challenge for himself.

Rather, he points out, that as soon as he gets the audio unscrambled, he is thinking about putting a similar "black box" into his own receivers. "I'm considering buying an hour a week of uplink time on a bird and scrambling it, both audio and video like M/A-Com. My receivers would contain a descrambler similar to the one I've made. Anyone who wanted to watch my hour of programming would have to use one of my sets. Of course, if it also happened to descramble HBO, Cinemax and others at the same time, that's not my problem!"

threat where it hurts the most—to their pocketbooks and they have come out fighting. And they have the wherewithall to conduct a brutal fight. (There are some 30 plus million cable viewers compared to under 2 million home satellite viewers. And the cable companies have substantial financial reserves.)

The cable operators undoubtedly

see home satellite viewing as competition that will break their monopoly on the viewer with regard to premium channels and much other programming as well. Understandably, they don't like it.

Thus today, now that HBO has finally scrambled, we find a situation where home descramblers are scarce and hard to find. Additionally, the

charge for descrambling is higher for home viewers (who have provided their own hardware) than it is for cable viewers.

If only programmers were involved, it's hard to see how this could have happened. After all, the programmers want as many people as possible to view the picture. On the other hand, it's fairly easy to surmise that HBO was under great pressure to protect the cable operators when it decided on its pricing system.

DISTORTING

Of course, anytime there is an attempt to control the market there is always going to be a "black market." This is usually run by believers in free enterprise who think only the market should determine who gets to see what. Something like this is already happening with scrambling.

Earlier this year, a number of cable operators (there are some good guys among the bad guys!) realized that the price differential between what HBO was charging home satellite viewers and what it was charging cable viewers was absurd. So, these cable operators began offering HBO/Cinemax to the home satellite viewer *at discount!*

The first offerings were for \$10 a month for HBO and \$15 for both HBO and Cinemas. By late February, when the Home Satellite show was held in Las Vegas, one cable operator, Haden McCulloch, was offering HBO for \$6.75 a month and both HBO/Cinemax for \$11.75, to anyone, *anywhere!*

To understand how cable operators can offer premium channels to home satellite viewers, one has to understand the system. Anyone can subscribe to HBO/Cinemax either direct or through a cable operator. When you go direct, the price is \$13.95 for one. When you go through a cable operator, he sets the price. Thus, if you subscribe to a cable operator who is charging only \$7 a month, you, the viewer, get a bargain. But how can an operator do this outside of his area?

To understand this, we have to know about how scrambling works. The prime scrambling unit in the U.S. today is the VideoCipher produced by M/A-Com. It unscrambles HBO, Cinemax, Showtime, the Movie Channel and probably a host of others. It is an excellent unit and functions quite well. (See accompanying list of receivers that will work with the M/A-Com unit.)

Each individual descrambler has an electronically coded "address." To de-

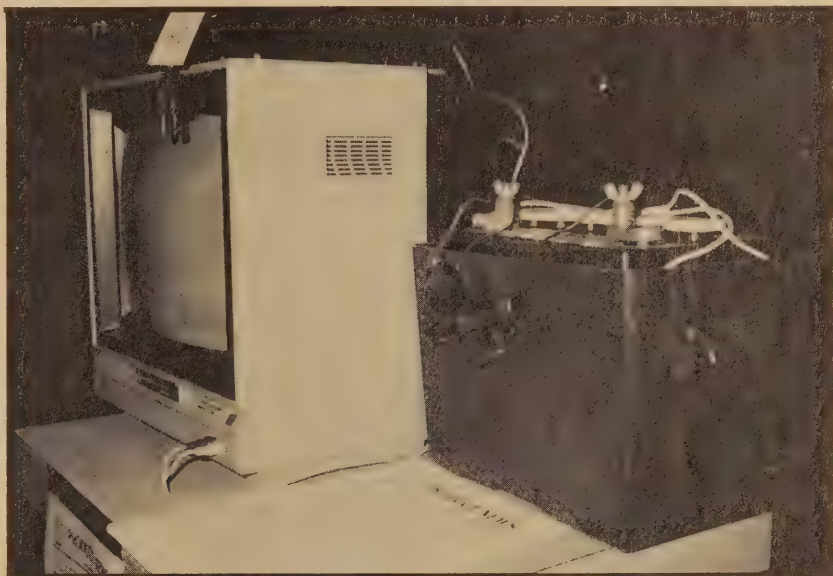
scramble, each unit must be individually turned on or "addressed." As soon as it's addressed, it will unscramble. Until it's addressed, the picture will come out just as scrambled as without the unit.

So, how is the unit addressed? This is where electronic wizardry comes in. Say we want to watch HBO. We pay our monthly fee and HBO sends along as part of its signal an invisible code, a code that addresses *just our descrambler*. Yes, that's right, as part of the signal, there is a separate code for each unit which addresses it and tells it to descramble. In addition, there's a separate code for HBO and one for Cinemax and so forth.

Incredible—HBO can turn our unit on or off. Yet, it has a flaw. The signal is broadcast from a satellite generally to the entire U.S. Thus, it doesn't make any difference where our descrambler unit is. If it happens to be in Florida or Nebraska or California, as long as the code is broadcast, it will receive it, be addressed and turned on.

Thus, we can subscribe to HBO, for example, through Haden McCulloch's *Mountain Pine Cablevision* (P.O. Box 406, Mountain Pine, Arkansas 71956, phone 501-767-3329). He can take our money and send HBO its share and request our box be addressed. HBO will send the code out over the signal

Continued on page 25



12 VOLT TVRO

Having a home satellite system is great, until you go on vacation. If you like to camp or tour, one of the first things you're bound to miss is all the channels and the quality picture of your home system.

Well, now you can have your cake and eat it too. You can have a home system *and* take it with you! Anderson-Scientific, a well-known manufacturer of receivers, has developed a module which can be installed in their units which allows it to operate "on the road."

The module allows the receiver to be played with 12 volt current. That's the kind that comes from most car batteries and electrical systems.

Just in case you're wondering, the 12 volts is more than enough power to run the receiver, the actuator and the TV (if you have one set up for the lower voltage system). An automobile battery generates an abundance of energy that can be utilized in this manner.

Of course, the receiver is only part of the system. A good portable dish is also a necessity for travel. (See the last issue of Home Satellite TV where portable dishes were detailed.) Portable dishes, however, are now produced by a number of manufacturers who offer compact and highly efficient fold-down units.

For taking your quality receiver with you and picking up all the channels anywhere on the road (remember, most birds are visible from anywhere in the U.S.), this system is tops!

MAXUM

RC-011S

a good deal
more
for a good deal
less



SINGLE AND BLOCK CONVERSION
QUARTZ CONTROL

MANUFACTURED BY WESTERN SATELLITE



Cable friendly - Cable operator Haden McCulloch (left) is interviewed by Bob Cooper after Haden offered to open up HBO and Cinemax to all satellite viewers for under \$12 a month.

Technology

Continued from page 23

and our box will be addressed wherever we are in the U.S.!

Simple. Suddenly the free enterprise system is back at work, right? Wrong!

When McCulloch first started this he called HBO pretending to be a subscriber and asked if he could subscribe to a cable operator outside his area. They answered that he could subscribe to any cable operator who would accept his money. He felt that was the signal to move ahead and he did. (See accompanying article in the 'legal column.')

Very shortly thereafter, however, HBO wized up and said, "Whoa!" It apparently didn't like the idea of price competition. It then informed McCulloch that it wouldn't accept subscrip-

tions from anyone outside the zip code of his cable franchise. That put a dent in the competition...for awhile.

Last we heard, Haden was out signing up every village and hamlet he could find for his cable company. In the past, most small or remote areas never had a cable franchise because the cost of stringing the wire far outweighed the income to be generated from subscribers. But not now. Haden and his counterparts across the country are staking out every square mile of land in the U.S. as cable franchises. They've discovered they don't need the cable anymore! All they need is the franchise, then they can sell the descrambler (Haden discounts his at about \$325) and discount the premium service. Who benefits? The viewer.

Will this happen soon in your neck of the woods? Maybe. Of course, the big established cable companies aren't

going to rush in. If they're charging \$10 a month to their cable customers, they aren't going to be too anxious to charge less to any home satellite viewers. But chances are they'll soon wise up, too. After all, if they can get a piece of the home satellite pie, why shouldn't they go after it?

Of course, not all the competition is coming from rebellious cable boys. Some is coming from programmers themselves. In March, Showtime/The Movie Channel announced their scrambling program. Everyone expected their prices to be lower than HBO (since they are a smaller programmer). But the surprise was at how low they were. Showtime or The Movie Channel were offered at \$10.95 a piece. A combination was \$16.95. The price certainly is coming down.

ON THE LEGISLATIVE FRONT

All of this hasn't been missed by our legislators, not with SPACE (Society for Private and Commercial Earth Stations) prodding them on.

There have been several anti-scrambling bills languishing in Congress for almost a year. Then, pressured by grass roots support for anti-scrambling last March, a telecommunications subcommittee headed by Rep. Tim Wirth (D., Colorado), held hearings. These brought out the problems and the pressures being brought to bear.

A growing group of Congressmen including Rep. Charles Rose (D., N.C.), Rep. W.J. Tausin (D. La.), Rep. Judd Gregg (R. N.H.), Rep. Carroll Hubbard Jr. (D. KY) and others voiced varying degrees of concern and support for the home satellite field. Taylor Howard (see accompanying article), Chairman of SPACE who helped coordinate the presentation later commented that Rep. Wirth suggested that there might be another round of hearings in the future and that the current bills in Congress might be brought off dead-center by a single bill which combine aspects of all the other current bills.

FOR THE FUTURE

One thing seems certain. Although the water is muddied right now, it will clear in the future.

There are many interests involved who want to get a piece of the financial action of home satellite viewing and when they do, many enemies will suddenly become allies. In the future, in fact, we may all try to remember why the whole issue seemed important. ▽

There's action being taken on the legislative as well as the judicial front. It's only a matter of time until access to all programming is made available to satellite viewers at a reasonable price.

Living With Scrambling

MAKING THE

BY BOB COOPER, JR.

The real world is often more comical, in a tragic sort of way, than fiction. The present status of the 'Scrambling Wars' between the TVRO industry (the good guys) and the cable tv industry (the guys in the dark hats) unfortunately reflects this sort of situation. The poor, hapless consumer is caught in the middle and doubtless does not find humor in much that is going on. In the last issue of *Home Satellite TV*, we warned readers that given the uncertainties of the present scrambling plans, any would-be buyer of home TVRO should exercise considerable caution. In particular, we suggested that the buyer should be certain that the equipment he is purchasing is indeed compatible with the defacto descrambling system standard manufactured by M/A-Com (The Videocipher unit). There is no longer any question about whether there will be scrambling, or whether the M/A-Com Videocipher system will be 'the' scrambling system. There is now scrambling, and yes Virginia, it *will* be done with the Videocipher system.

Elsewhere in this issue we reflect on the first round of hearings held by the House Subcommittee on Telecommunications back on March the 6th. In case you have not been interested in how proposed laws become real laws in this country, this brief explanation:

- 1 Any member of Congress may draft a bill and enter it for consideration. Drafting a bill for consideration is an ego trip; most such drafts are never considered by the full House. That's where the various Subcommittees come in.
- 2 Each bill has some area of public life it deals with; transportation, for example. Bills which somehow deal with telecommunications end up being assigned to the Subcommittee on Telecommunications. The subject of telecommunications does not merit its own "full committee" because there are only a handful of such bills drafted each year. Within that Subcommittee, the 'chairman' is the all-powerful person. A Congressman graduates to Chairman after serving on a Subcommittee for a period of years, by attending a high percentage of the meetings of the group, by being aggressive and outspoken and by being a member of the 'right' party.
- 3 Congressman Tim Wirth, a Democrat from Colorado, heads up the House Subcommittee on Telecommunications. All laws dealing with television, radio, telephones and so on must be handled by his Subcommittee. Once his Subcommittee has met to discuss these proposed laws, then the bill moves ahead (at the wish of the Chairman) to the 'full committee.' And there again we have a new 'Chairman' and another round of meetings where the bill is once again debated.

- 4 Then after the bill has been finally approved 'out of committee' it is sent to the 'floor of Congress' where at the discretion of the Speaker of the House, it may or may not be scheduled for floor debate and consideration.

Thus, a piece of legislation, written and introduced, is barely beginning its trip through Congress. A bill can be stopped, dead for all time, by the Chairman of the Subcommittee, the Chairman of the full committee, by the Speaker of the House or by any member of Congress who holds a Chairmanship on any Committee which might have even passing interest in the legislation.

Several pieces of legislation have been introduced into the House 'hopper,' by various members of Congress, in the area of satellite regulation. None of these bills has *yet been scheduled* for handling even by a Subcommittee. Of the many bills introduced to deal with satellite TV, only one (HR4414) is presently given even a 10 percent chance of passage during *this session* of Congress. Chances are you have not heard about HR 4414 previously; we will discuss it shortly. Oh yes, the House is expected to adjourn in early October this fall, since this is an election year. That means that all of those bills written and introduced will automatically 'die' when the House adjourns, and to be considered by the next Congress, have to be re-introduced when the new Congress convenes in January of 1987.

Of all the roadblocks facing a new piece of legislation, the first 'Subcommittee hurdle' is perhaps the most challenging. Here's why. Thousands and thousands of bills are written each session of Congress. Only a few hundred make it all the way through the 'gauntlet' to the floor of the House. Of those that do, not all pass the House and even fewer pass both the House and the Senate.

I know; this is boring Civics 101A. But if you are going to be able to deal with the reality of Congress coming to the rescue of the TVRO industry, you must at least understand the basic problems facing new legislation.

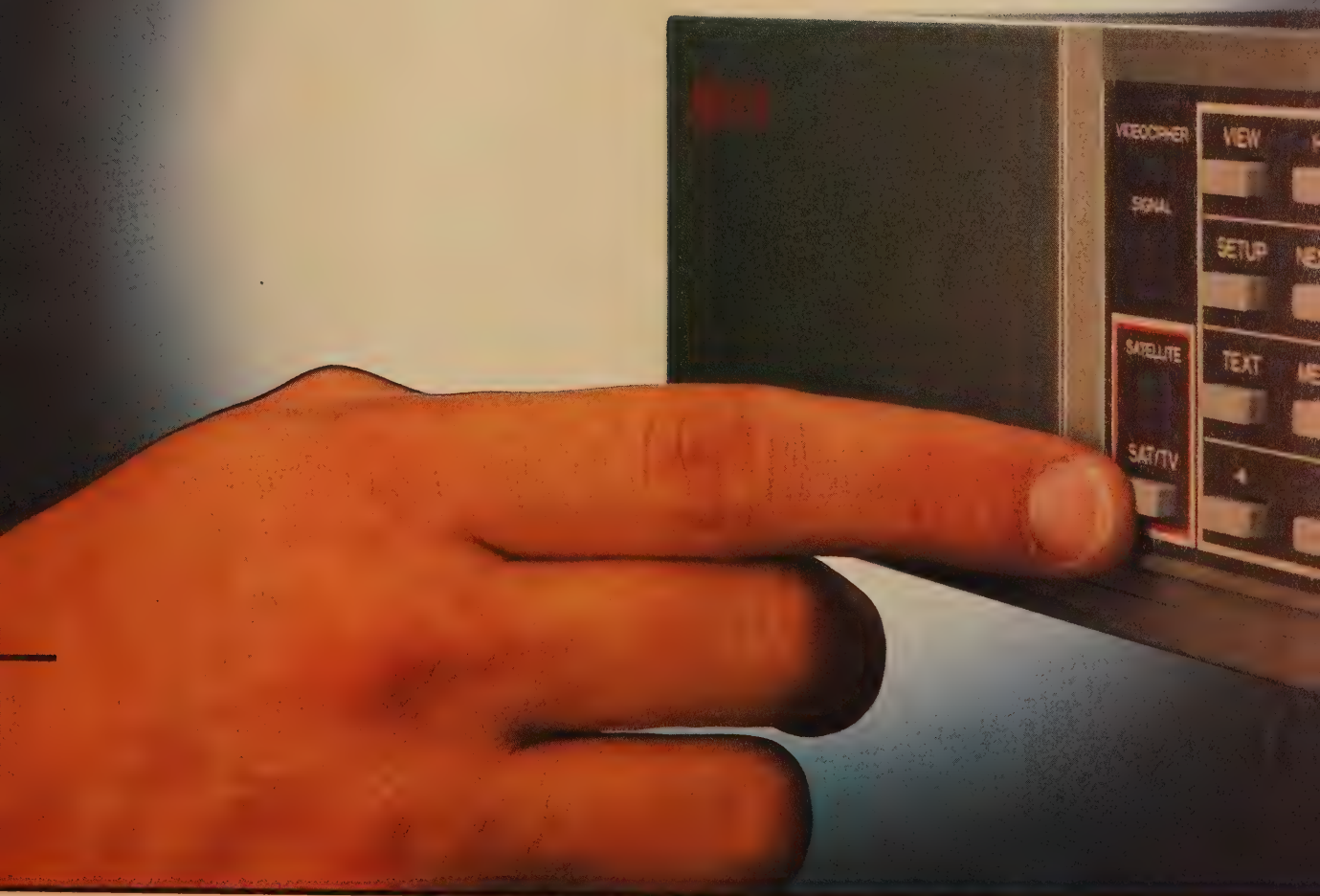
New legislation does not just happen; certainly not smoothly, and seldom with any speed. *That's on purpose.* By slowing down the legislative process, by making it difficult for an idea to become a law, we avoid many unnecessary laws. Of course, we also lose a few needed, good laws as well

Continued on page 28

Turning off the scrambling - *The M/A-Com box is the one to do it, unless Congress rides a white horse to the rescue. Cooper suggests that while some Congressman may be playing to the satellite viewers, they may be dancing to different fiddlers.*

HOOKUP

*"Coop" Looks At The Big
Picture Of Political
Infighting And Electronic De-Scrambling*



Hookup

since the system works counter to rapid passage of any but the most crucial matters.

WHAT LAW DO WE NEED?

Ask any TVRO dealer and he will tell you "We need a law that insures that descramblers are universally available to anyone who wants one, from a variety of sources at a variety of prices. And, we need a law that says *all* TVRO users/dish owners have unrestricted access to all of the scrambled programs at pricing that is not discretionary and through programming sources which are not controlled by the cable television industry."

That seems like a decent law to most. It merely says that dish owners will not be treated like second class citizens, denied access to television or forced to pay extraordinary rates for their television programming.

The TVRO industry reports greatly depressed sales. They attribute this decline in commercial activity to the confusion associated with scrambling, and the consumer fear that a dish may not be worthwhile once a large quantity of programmers do scramble. We'll deal with that shortly. But first, let's reflect on what has happened to TVRO sales.

They are down, no doubt. There have been many business failures and that is sad. But as a prominent Congressman addressing this issue recently said: "*The fact that an industry is not doing particularly well should not be the reason for a new public policy (ie. Law).*" In other words, Congress cannot be asked to dash in to save an industry just because it is doing badly. The history of Congress is that it is moved by 'public concerns,' not private concerns. The only real issue Congress sees in this situation relate to whether or not people will be denied access to an important communications system; that is, satellite television. If Congress is assured that people are not denied access to television by satellite, Congress will stay out of the legislative solution business. Congressman Bliley from Virginia said it well for the rest when he noted "*As long as (cable programmers) provide adequate descramblers and adequate programming at prices to consumers that are not greater than charges to cable subscribers, you need fear nothing from Washington.*" Congressman Oxley from Ohio warned us, "*If we (push through) legislation in this area at this time, it would be inconclusive and not very effective.*" Bliley urged the combatants, cable and TVRO, to work very hard at resolving the differences and to stop the present battling. He warned the cable operators "*If you do not (work it out), you are going to get regulation; probably more regulation than is needed or wanted.*"

With a few notable exceptions, very few members of Congress are in favor of legislation to resolve the present dispute. The sorry state of TVRO business affairs is *not* a factor in this situation. Legislation introduced one year ago, suggesting a two-year moratorium for scrambling, seems dead. Congressman Tauzin suggests, "*This bill would be a mistake and it is dead in Congress. All it would do now is confuse the consumer even more.*"

Tauzin is one of the handful of legislators who feels strongly that some sort of legislation is needed. He has co-authored a bill which would put the Federal Communications Commission in charge of resolving disputes between cable and TVRO. Tauzin is one of those who believes that unless cable is forced to market at fair prices to TVRO, it will not happen. Tauzin warns, "*I believe that unless this*

issue is resolved in the next six to eight months, the TVRO industry (as we know it) may be snuffed out."

WILL THERE BE A LAW?

As noted, even the most optimistic members of Congress see very little likelihood that there will be new legislation to 'bail out TVRO' during this year and this session of Congress. And since 1987 starts the Congressional year all over again, it also becomes clearer that if we must go far enough into 1987 to allow the drafting of new bills, and time for various Subcommittees, Committees and the Speaker of the House to deal with the new bills, we are at the very least well into 1987. That doesn't sound like a 'rescue mission' moving at great speed.

Congressman Tauzin's six-month-warning aside, there is one piece of legislations pending which may be on the so-called 'fast-track.' And that is HR 4414, a bill drafted by Congressman Richardson from New Mexico. This one may surprise you.

Richardson says he has seen many examples of satellite TV retail advertising which concerns him. He feels that many of the advertisements he has seen, and many of the statements he has heard from satellite dish dealers have the effect of mis-leading the consumer public. Richardson wants to stop this and he figures that the one law needed most right now is a law that forces the satellite dish dealer to 'fully disclose' the nature of scrambled services to the consumer before the consumer purchases a dish system.

Accordingly, Richardson has gotten the word of a prominent Subcommittee Chairman (Florio of New Jersey) to hold hearings on his HR4414 perhaps as soon as May/June.

Here is what the legislation would do:

- 1 The Federal Trade Commission (FTC) would be given the power to monitor dish system advertising and dish seller sales practices.
- 2 Every satellite dealer would be required to make a standardized, full disclosure to any potential customer for a TVRO. We'll look at a portion of the first draft disclosure shortly.
- 3 If a dish dealer failed to publish or include the disclosure in any of his advertising, or he failed to explain the 'limitations of a private dish system' to any consumer during the course of his sales pitch, the FTC could bring penalties to bear on the dealer.

Basically, what HR4414 is trying to do is to make sure that nobody will ever again purchase a TVRO or be subjected to advertising for a TVRO without *first being told* of the realities of scrambling. There are ample examples of similar warnings all about you. Cigarette advertising, for example, prominently mentions the Surgeon General's fears that smoking can be dangerous to your health. When you visit a used car lot now, you will see a federally mandated window sticker advising you of the condition of the car, and it may also include statements about the repairs the car needs and the expected cost of these repairs.

Congressman Richardson and the Federal Trade Commission are suggesting language that starts off something like this:

"Certain private home use of satellite earth stations is permitted by law. Satellite earth station owners may be required to pay monthly charges for each of the satellite cable programming services they receive. Unauthorized interception of satellite transmissions of television network

programming and other programming not primarily intended for cable television is strictly prohibited."

The same warning will also tell the listener or reader that using a home satellite system for commercial use, such as in a motel or bar, is 'against the law' and intercepting programs not intended for cable TV use (such as PBS, for example) is also against the law.

The law as drafted would not only require this information to be included in all advertising, but it would also require that every dish system sold include a sales contract which has this information in the sales contract. It has further been suggested that a copy of each sales contract would be filed with a federal agent of some sort to allow the federal government to keep tabs on who has purchased (and is using) the dish system.

Well now, if dish system sales have dropped by 80 to 90 percent because of the public's concern about scrambling, what do you suppose might happen when every prospect for a TVRO is forced to not only read or listen to this disclosure but is further advised that they must sign an agreement attesting to the fact that they have read and understand the disclosure before they can take delivery of their satellite system? Tilt.

OTHERWISE HOW IS IT GOING?

With all of the potential problems facing the long term growth potential of dish systems, what about the initial roll out of the M/A-Com Videocipher product? An update.

HBO and Cinemax began fulltime scrambling of their four transponders on January 15th. That was when the world collapsed on the TVRO industry. Since that time, super station WOR has begun fulltime scrambling and Showtime, plus The Movie Channel, were scheduled to begin fulltime scrambling of their four channels early in May. That simply means that as many as nine of the more popular services are scrambled as you read this.

The good news is that, to date there have been no serious glitches with the scrambling system or the Videocipher units. Let's see how one works and how you get authorized.

A. The Videocipher 2000E unit or the 2000E/B unit connect to your satellite TV receiver between the satellite unit and the TV set. The E unit is for those receivers which have a 70 MHz (megahertz) loop-through connection on the rear panel. The 2000E/B unit is for those receivers with special circuits inside that allow the descrambler connection through something called 'baseband out.'

This warning. While more receiver models work with the VC2000E than with the straight version, there are still others which work with *neither model*. A few receiver manufacturers have refused to make the internal modifications to their receivers to allow retrofitting or plugging in the descrambler units. It would be unwise to purchase (or keep) such a unit. As a consumer you need to have some pretty firm evidence that the system you are purchasing will actually *work* with the Videocipher unit.

B Instructions for installing the Videocipher are packed with each unit. Ditto instructions for getting the unit authorized. We'll hit the highlights although the full process is only slightly longer.

Once it is hooked up:

- 1 You call an 800 number (found in the instructions) with two items handy: a VISA or Mastercharge card and the identification number found on the rear panel of the VC2000.

Continued on page 30

Blank Screen - Videocipher goes into "dumb mode" and displays nothing.

Scrambled Screen - Appearance of picture on receiver not equipped with descrambler.

No Authorization - Screen explains why you are not receiving picture.

Approved - When you subscribe, screen momentarily flashes confirmation.

Text Service - Advises of information on scrambling on a one hour format.

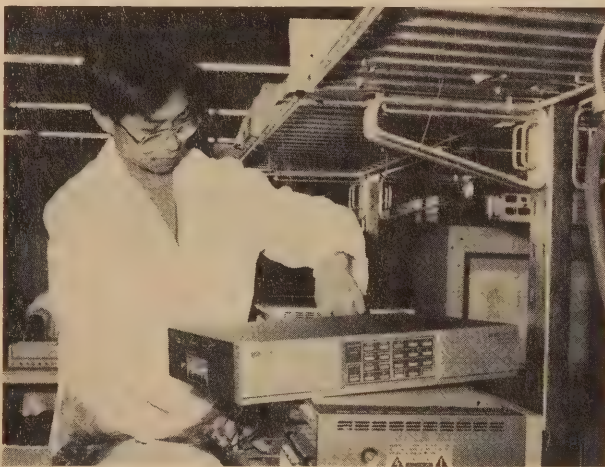
Scrambling - Also provides tips on using the descrambling units.

Pay-Per-View - Some other scrambled programming can also "accidentally" be descrambled by Videocipher II.

Clear Picture - The descrambled view is quite acceptable.

Hookup

- 2 "I wish to be authorized for (_____; HBO, Cinemax, etc.)" you say to the typically male operator. He will ask you for your unit number (from the rear of your VC2000), your location including street address, and how you wish to pay for the service.
- 3 If you elect to take less than the full service package, you will also receive a mild sales pitch for the services you are not selecting. If your area has a cable franchisee, you will be told that you may order the service(s) from the local cable franchisee(s). You have the right to refuse that suggestion.
- 4 If you are ordering late in the month, you will receive a delayed billing to your credit card; ordering on May 25, for example, will result in your first billing showing up on your credit card statement for the month of July. They bill or charge your credit card in the middle of the month for the next full month so late in May they would hold the charges for the balance of May, plus June and July, until the middle of June. After that they charge your account in the middle of each month for as long as you wish the service. Well, almost.



Building Descramblers - The production line at M/A-Com where 200,000 VideoCipher IIs are promised for this year.

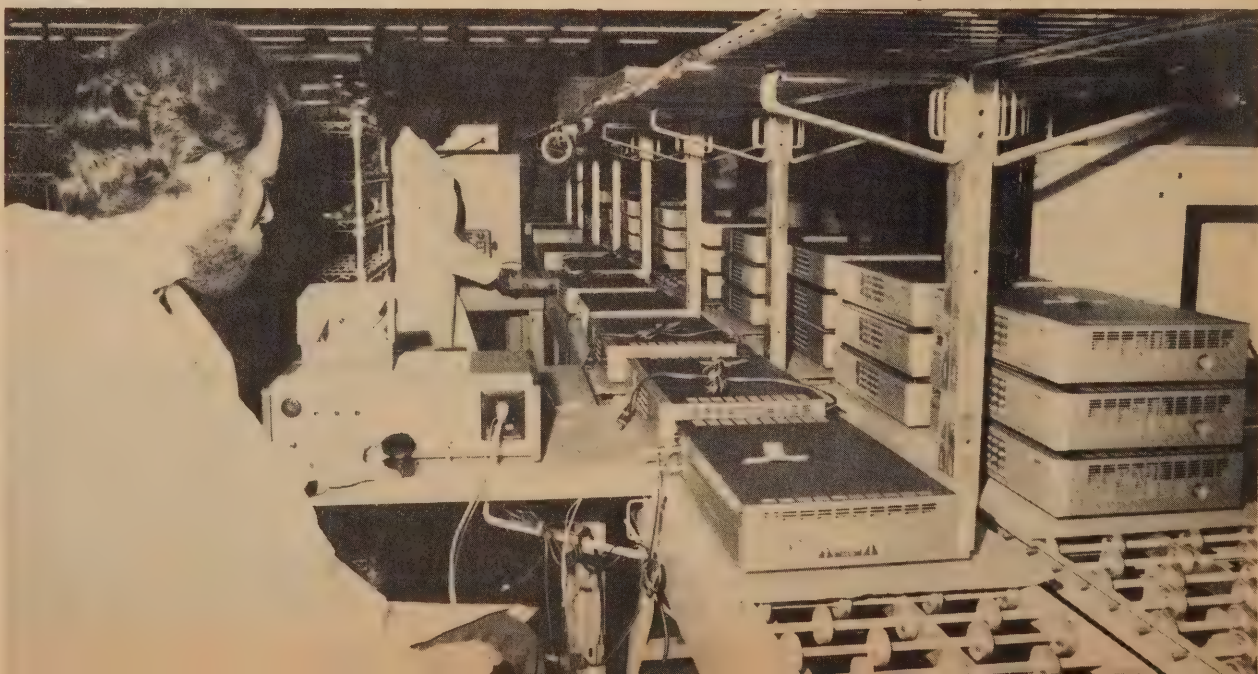
Several weeks after you sign up for the service, you will receive a package in the mail. It will consist of a program guide and a 'contract.' The contract is quite one-sided and the subject of some controversy at the present time. Here's why.

In the contract, you are told that your 'act of payment' represents that you agree to all the terms of the subscriber agreement (contract). In those terms you agree that you will not use the unit in a commercial application (ie. in a motel, condo, etc.); that you will not take the unit outside of the United States (ie. the Bahamas); that you *will allow* an authorized representative of the programming service (ie. HBO) *to come into your home at anytime* to inspect the unit and how it is connected. It is your agreement to allow somebody into your home to inspect your descrambler which has the civil libertarians in the crowd all aroused.

HBO maintains that *unless* they can physically inspect the presence of the unit, and check the serial/identification number, they cannot police how and where the units are being used. Reportedly, one of the duties of the local cable franchise will be to do an audit on units in his area on an annual basis. That brings up another interesting situation which came to light during the March 6th hearings. The HBO 'Kick-Back' to the cable franchisee.

Remember that you are advised as you sign up that you can subscribe to the service through a local cable franchisee, if you wish. In some cases, the cable company is charging something less than the full HBO (\$12.95) rate. So there is some logic to buying locally, unless you simply do not wish to do business with the local cable company. During the hearings, HBO's *Michael Fuchs* admitted under questioning that his firm is rebating \$5 per month to the local cable franchisee for each \$12.95 they collect. In effect, the cable company collects \$60 per year from you for doing nothing. Well, almost nothing. There is that 'audit function.'

HBO considers the audit function important. They have maintained from the onset of scrambling that thousands of motels, condos and other public facilities were 'stealing' their programming for commercial use. There was the suspicion that many of the first units bought and installed for 'private use' were like to be going into commercial installations. HBO has been spot checking units, they claim, to



verify that they are indeed in homes. Units located at addresses where cable TV firms provide service will be the first to be checked since the cable firms are right down the streets. Units some distance out in the boonies are far less likely to be checked.

- 5 Finally, you will be told that within ten minutes time (varies as a function of work load of course) your authorization should be transmitted. You are asked to call back if you do not receive the signal in that period of time.

Your unit is actually authorized for a *full month* at a time. If you are authorized for service late in a month, you are authorized for the tag end of the current month and all of the coming month. Your unit stays authorized until the tag end of the last current month in the billing cycle. You are re-authorized for the next month in the last days of the current month. M/A-Com suggests that if you are not going to be using your system for two months, you may have to go back through initial authorization cycle to get back on line.

- 6 It does work, and perhaps we should all be grateful for that fact. Reports of user problems have been slim to none.

PRACTICAL USER TIPS

As a user, you will quickly learn that a number of special features are built into the system. For example:

The system is self diagnosing. It provides you with an electronic on-screen count which aides you in determining whether your satellite signal is good enough for descrambling.

The system advises you when you tune in a service for which you have no subscription authorization. The screen

goes blank and is then highlighted with a message that reads 'No Subscription.' That's plain enough and you move on. Unfortunately, when you encounter a service which is scrambled but for which no private home authorization is possible (some of the new pay-per-view services for cable, for example), the screen merely goes blank and says nothing.

A text service informs you of the latest news in the scrambling world. The data channel has been programmed with some pretty uninteresting information to date but the capacity to program it with information programming and scrambling service tips is there. Perhaps as the service grows, this extra service will become more valuable (see example here).

M/A-Com has begun transmitting a three hour per day 'scrambling information channel' on Westar 5, transponder 22, from 8 pm to 11 pm eastern daily. This is a taped presentation running 1 hour in length, repeating at 9 and 10 PM. It is an example of corporate-M/A-Com trying to be informative and helpful to a group that largely has learned to hate their guts. At the very least, this is costing M/A-Com around \$10,000 per week or more than \$43,000 per month. If M/A-Com had sold 9,000 of their VC2000 descramblers by the 1st of April, they had about \$5 cost per-descrambler per month wrapped up in this 1 hour program that presently repeats itself more than 90 times per month. The concept is good; the implementation is not. They, too, will find better ways to use their money as scrambling matures. They are to be commended for trying.

SYNOPSIS

Congressman Eckhart of Ohio said it as well as anyone. "These two industries (cable and TVRO) must learn that they should stop battling one another; it is a symbiotic relationship." Congressman Tauzin echoed "The issue is not whether there is going to be scrambling; it is happening, now."

Some elements in both industries continue to view the situation as naturally hostile. SPACE persists with the approach that cable is out to bury TVRO and the dish industry can only survive by drawing attention to cable's indiscretions.

There is considerable evidence to substantiate SPACE's contention. On the opposite side of the coin, dish retailers have aroused the attention of Congressmen such as New Mexico's Richardson, and his bill (HR4414) to force 'full disclosure of viewer rights' will certainly not help the struggling industry nor the slumping sales. There is ample evidence that Richardson is pushing this bill because he has seen considerable proof that dish retailers have misled dish consumers.

Congress has made it plain that economic problems for an industry do not normally constitute reason for Congress to write new public policy into law. Congress saves rail lines, and on special occasions, significant defense contractors such as Chrysler from economic disaster. But those are rare examples indeed of direct government intervention into the economic process.

There is through all of this the slow realization that scrambling can be a routine part of home dish service; that the system can work and indeed will work if given the opportunity. The skies have not gone dark, as forecast, although many private attitudes of people involved have gone dark. Slowly, a mind at a time, small lights are now coming back on. TVRO distributor Sandy Wirth summed it all up:

"When the skies go dark, the stars come out to play."

UPDATE ON SCRAMBLING/FREE

Bob Cooper's monthly dish trade journal for dealers and distributor's, Coop's Satellite Digest, provides those interested in obtaining an accurate report on the status of scrambling with a three minute recorded 'Scrambling Hotline' telephone service, 24 hours per day. Simply dial (305) 771-0575 to obtain a report by Coop on the latest changes in scrambling services and a synopsis of the various problems faced by the scrambling transition.

The 'Scrambling Hotline' is updated when new information becomes available and it augments a written report produced by Coop every 30 days on the status of scrambling. The written report covers detailed listings of various TVRO receivers that have been tested for interfacing to the Videocipher descrambler, reports on sources for descramblers, and the status of the various services planning to scramble.

Copies of the written report are available by calling 305/771-0525 between 9 am and 4 pm eastern weekdays with a VISA or Mastercharge card handy. The price per report is \$10 each and it is shipped via first class mail typically the day of your order. Between the written report and the 'Scrambling Hotline' telephone service, you should be able to maintain a knowledgeable, current assessment of the true nature of the transition to scrambling in the TVRO industry.

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Scrambler Compatibles

Is Your Receiver On This List?

Before you purchase a descrambler, you want to be sure it will work with your receiver (it doesn't with all). M/A-Com, the manufacturer of the VideoCipher II, releases updates on those receivers which are compatible.

There are two different descramblers or more precisely, the descrambler has two different interfaces. The model 2000E uses a 70 MHz IF Interface while the Model 2000E/B and 2000E use a composite video interface.

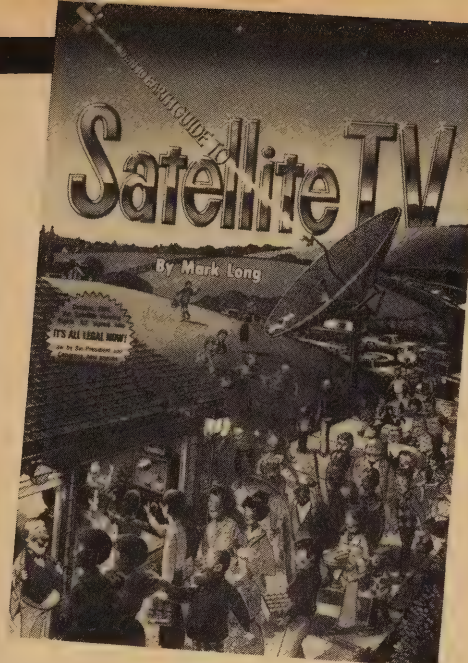
If you're not sure which model to get, check the list below. It will tell you which descrambler fits your receiver. (Note: this list is updated periodically and was the latest when we went to press. If your receiver is not on it you may want to check directly with M/A-Com, Video Products Group, 3033 Science Park Rd., San Diego, CA 92121 (619) 457-2340.)

Model 2000E/B and 2000E - Composite Video Interface

Brooks B-250
Channel Master 6135
Channel Master 6137
Channel Master 6144
Drake ESR 424 Block System
Drake ESR 524 Block System
DX Communications DSB-600
DX Communications DSB-700
Janeil BCR-8000
Luxor 9570
Luxor 9900
Luxor 9995
M/A-COM H-1
M/A-COM T-1
M/A-COM T-2
M/A-COM T-6
NORSAT JR-100
NORSAT JR-200
NORSAT XT-100
NORSAT XT-200
Panasonic C-1000
Panasonic C-2000
Panasonic Ku/C-6000
Radio Shack SR 2010
Radio Shack TDP 900
Scientific Atlanta Homesat 800
Standard MT800 - Agile Omni
Zenith ZS-3000

Model 2000E - 70 MHz IF Interfaces

Amplica CSR 100
Amplica CSR 200
Amplica CSR 300
Avcom COM-2A (LNC RDC-11A)
Avcom COM-2B (LNC RDC-11A)
Avcom COM-3 (LNC RDC-3)
Avcom COM-3R (LNC RDC-3)
Birdview 20/20
Boman SR-1200
Boman SR-1500
Boman SR-2500
Channel Master 6129
Channel Master 6130
Channel Master 6131
Channel Master 6134
Channel Master 6138
Chaparral Sierra*
Drake ESR 24**
Drake ESR 224*
Drake ESR 240*
Drake ESR 240A
Drake ESR 324
Drake ESR 324 Block System*
Drake ESR 324 S Block System*
Drake ESR 424 Block System*
Drake ESR 524 Block System*
Drake Black Widow Series I**
Drake Black Widow Series II*
Earth Terminals
GCI 8300
Houston Tracker System V*
Intersat Baby Q
KLM Skyeeye X
Lowrance System 70X
Luxor 9550
Pico CR 1000*
ProSat 315 (LNC P-511)
ProSat 330*
SatStar Elan
Sat Tech R-5000
Sigma-Vu Mark IIA
Sigma-Vu Mark III*
Sigma-Vu Mark V*
STS MBS-SR
Toki TR220
Uniden UST-1000
Uniden UST-3000
Uniden UST-5000*
Uniden UST-6000*
Uniden UST-7000*
Wilson YM400
Wilson YM1000
Winegard RF-1000



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By Mark Long \$7.95

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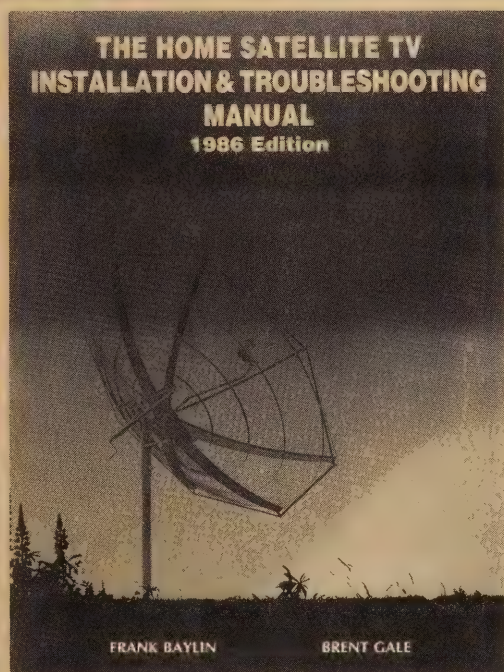
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Satellite Television's FUTURE is NOW!

Come On In, The Viewing Is Fine

BY BOB WOLENIK

I am frequently asked the question, "Should I buy a home satellite TV system now, or wait?"

At first, I was somewhat undecided myself. The technology was new. Different forces were coming into play and some, like scrambling, were having a negative impact. Would it indeed be better to wait?

Recently, however, when anyone asks, in good conscience I can respond, don't wait. Act immediately.

The reasons are obvious. First, there is the matter of the equipment. In the home satellite field, the hardware has come of age. At one time a buyer might be wary of poor designs and even poorer assembly. But today, dish antennas, actuators (which turn and aim the dishes) and receivers are being manufactured in most cases to high quality standards. The equipment works and works well.

Second, the future technical changes such as a possible switch to Ku band (a higher frequency requiring a slightly different receiver and a smaller antenna) are already built into many units today. Many new receivers are both C-band (the current standard) and Ku band either compatible or upgradeable. And converting a dish to Ku band or buying a new Ku band dish (see accompanying article) is relatively inexpensive.

Third, the fears of scrambling now appear to be largely overblown. It looks like descramblers will soon be made available and both the cost of these as well as the monthly cost of descrambling will come down. (See the accompanying article on scrambling.) Thus, one who buys now will see a great deal of TV for free. And eventually, when more channels become scrambled, this person will have first option at buying a unit that will descramble the picture.

Fourth, the issue of unreasonable zoning restrictions, which saw some cities obstructing the erection of dish antennas has largely been laid to rest. The recent Federal Communications Commission (FCC) ruling helps to prevent unreasonable zoning to prevent dish construction. Chances are that now, no matter where you live, if you want to put up a dish, you probably can.

Thus, for these reasons, now is a particularly applicable time to buy a home satellite receiver. Oh, and there's one more reason. When HBO/Cinemax began scrambling their signal in mid-January, it had a profound impact on the field. Sales virtually stopped. Manufacturers, who had been assuming a rapid increase in sales, found themselves with large inventories. Dealers found themselves with overhead to pay and with reduced income from sales.

All in all, it was a very hard time for the field which meant that the buyer suddenly was given the opportunity to find real bargains. Top rate equipment went cheaply and dealers

were wheeling and dealing to get customers in the door. It was a bargain hunter's bonanza.

Of course, it won't last. Sales have once again begun to turn up and by the time you read this, many of the bargains may be gone. But there's certain to be plenty left. This is still an opportune time to save money on a home satellite system, but you have to act quickly.

That's the way it looks today.

A BRIGHT FUTURE

The future is even brighter.

Today, there are as many as 150 different video channels available to U.S. viewers. (The total number changes as programmers come and go.) Tomorrow there may be two-way communications!

Hughes Communications is currently working on a system that will allow both downlinking (receiving the signal) as well as uplinking (sending the signal) from a small system. They envision it as helping companies communicate between stores and offices. The complete system, in quantities, is designed to sell for under \$10,000.

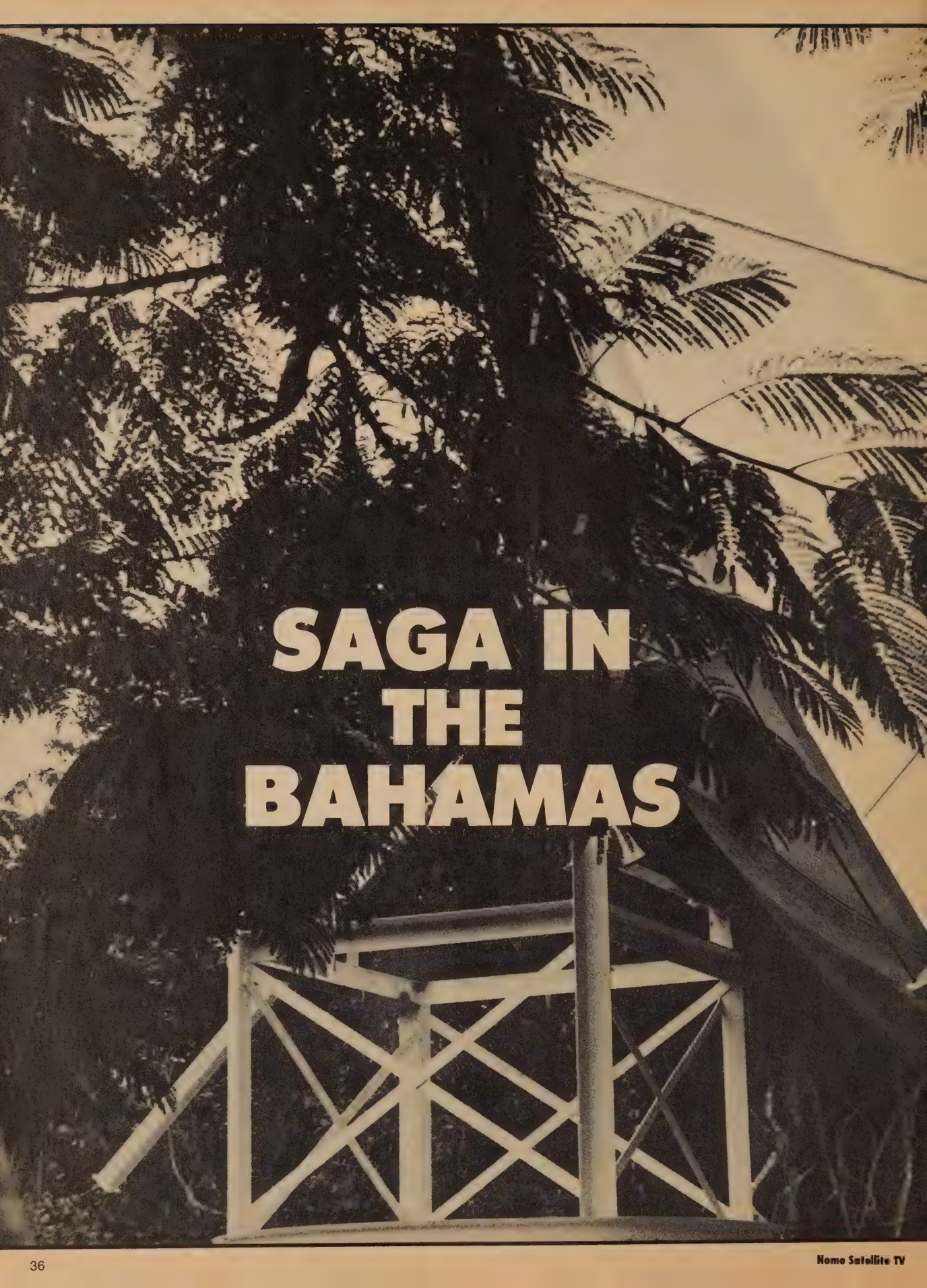
But it wasn't half a dozen years ago that a home satellite system sold for \$10,000 and today a basic unit can be purchased for as little as \$1,000. Is there any reason to think that a system that can both uplink and downlink will also not come down in price?

Think of it. You buy a home satellite receiver system today and watch scads of video. Then, in the not too distant future you receive, but you can also send! You can broadcast to other individual receivers (yes, it's possible to address each receiver in the country separately—see the story on scrambling to see how it's done) or, if others desire to see you, to a whole group. It's the old promise of video-telephone come true.

Of course, that's not all. Hughes is also working on mobile satellite communications. What's currently on the drawing boards (meaning it's only 2 to 3 years off) is a system that will allow both uplinking and downlinking of an audio only channel from moving vehicles like vans or cars. It's like the idea of cellular phones that's currently popular. Only instead of having to be in the cellular phone area, you can be *anywhere* in North America! As soon as this system goes into operation, we can be sure the demand for a video channel will be enormous and the technology to make it happen will surely not be far behind.

With home satellite technology, the future is already here and things over the horizon will arrive with surprising speed. Thus the promise of benefits is real for those who buy today and upgrade tomorrow. ▀





SAGA IN THE BAHAMAS



Strange Happenings With A Giant Dish

BY JIM VINES

Nassau, Bahamas; September, 1980. I found myself in the kind of predicament every designer-manufacturer of TVRO hardware dreads: bailing out a dealer who "got in over his head", while absorbing the wrath of the dealer's customers.

First, some background information. Seven months earlier this writer demonstrated Intelsat reception with a small (for reception of Intelsat) 16-foot TVRO antenna. The occasion was the TVRO industry's second-ever trade show, Bob Cooper's SPTS '80/ Miami. (This writer also demonstrated his antennas at the industry's first-ever trade show, SPTS '79/ Oklahoma City.)

During the Miami show the dealer (with our help) ran cable from our big dish to his display booth indoors where show attendees from South America and the Caribbean could watch TV live from Sao Paulo, Brazil.

The dealer then purchased the antenna and I helped transport the parts to nearby Hialeah where I reassembled it in front of his office.

The following summer, the dealer—always a clever promoter—staged several "media events" which were covered by the Miami Herald, the wire services, and the major TV networks.

The most widely-publicized "media event" was the public showing of the USA-boycotted (and blacked-out) Moscow Olympics, received from a Russian "Statsionar" satellite.

The first hint that something was out of control came to us in mid-summer when the dealer (Had he spent too much time in the sun?) was quoted by the news media as having designed and manufactured the antenna. The news came from Hoopston, Illinois where my dad had read about it in the Danville Commercial-News. Although outwardly composed, I could tell that he was very disturbed.

The news struck me as odd since I was getting monthly statements in the mail from my patent attorney for ongoing work on my behalf, work that ultimately resulted in both U.S. and Canadian design and process patents being granted.

Since the dealer ordered four 6-meter dishes in quick succession, it was judged acceptable for the time being to overlook his occasional "memory lapses". We also hoped he would spend more time in the shade.

Now, the installation of a 6-meter (19.7 foot) dish is not for beginners. After discussing the impending installations of the three "sixes" down in South Florida and another in the Bahamas with several other of my dealers, I offered our collective help to assure that the installations would culminate with the Hialeah dealer's own people getting top-notch field instruction and all of his customers becoming satisfied users.

Continued on page 38

Special Assignment - Install a nearly 20 foot dish without skilled help in Nassau. Adding to the problem was running 700 feet of cable from the house to the antenna. When it was finally set up, there was no picture!

Bahamas

"We have our own professional crew", I was told. "We'll take care of the installations." Reassuring words, but still I wondered. Not too many days passed before the dealer was back on the phone, asking me to call a customer of his in the Bahamas and "... patch things up as he may cancel his order. I told him I'd deliver in three weeks." (I had told the dealer it would take 12 weeks to deliver as these were our very first six-meter dishes.)

That evening I had my first encounter with the crusty and cantankerous Tom Josephson—by long distance phone call and on my "nickel". In spite of the distance my left ear got a good blast from the retired British industrialist.

Suddenly the dealer decided it would be safer if I would accompany him to help install Tom's dish in Nassau.

Late September, 1980. I flew to Miami to meet with the dealer before going over to Nassau and Tom Josephson. But first we would go to the home of a prominent Miami area builder-developer.

Sounding like Desi Arnez, the dealer wailed, "Aye yi yi yi YI! We got problems over at (name of customer)." After the long drive from Miami International Airport through P.M. rush hour traffic, we arrived at the customer's house. (One could call it a fortress!); where in-the backyard I beheld a badly mis-assembled antenna. That was Surprise One.

Surprise Two came when the "professional crew" was introduced: a pair of youngsters—perhaps twenty years old—who had struggled long and bravely at the task for which they had not been adequately trained. "Boat people," the dealer explained. "They don't know English so I'll translate your instructions."

At this point you may be wondering how any dish manufacturer could let his product fall into such unqualified hands. This was 1980, there weren't more than a handful of "TVRO dealers" back then; and finally this chap was a heck of a salesman and promoter. In spite of his technical deficiencies, his talent for bringing media exposure to the fledgling TVRO industry deserves recognition.

After bringing the customer's dish up to snuff with the two young "boat people" that hot September evening, I got a good night's sleep. The next day I flew over to Nassau to meet with Tom Josephson and start organizing the dish installation at his estate. The dealer would arrive a few days later.

Following the limousine ride from Nassau's airport to the Josephson estate, I was deposited in front of an imposing (one might say intimidating) mansion which was surrounded on all sides by a dense tropical garden. One could wander away and become truly lost, I speculated.

Once indoors, I was ushered down a long hallway to "the office". Perhaps by design, "Mr. Josephson" did not arrive immediately. When he finally arrived, he brought along a mighty sharp "needle": "So you're the chap who makes those antennas. You ought to pay more bloody attention to who represents you!"

With the very capable help of Tropical Electronics' chief technician Mack Sampson (who had done all of the Josephson's regular TV antenna work), the antenna was almost assembled when the dealer arrived.

Sadly, the antenna never had a chance to "show its stuff" while I was there. The dealer was to return the following week (which he did) but he never got the electronics working.

Six weeks later Tom Josephson phoned. "That bloody

(name of dealer) never did get me any pictures!" he belated. So I arranged for a top-flight, reputable technician named Bob Christofanelli (Earthstar Corp.) to fly down to Nassau to evaluate "the damage" at the Josephson estate.

Remember this occurred in 1980, long before block down-conversion had been perfected. The dealer's plan was to situate the 3.7-4.2 GHz receiver inside the poolhouse 700 feet away from the Josephson house but only 125 cable-feet from the dish. The receiver was to be remotely controlled over 700 feet of wire. The problem with this was that the tuning voltage over such a great distance was too unstable for any receiver to lock onto any satellite transponders.

Another problem arose from the dealer's insistence on running 800 feet of low-voltage ribbon wire from the polarizer control (in the house) out to the polarizer. (Back in 1980 one used an ordinary TV antenna rotor to physically turn the feed from horizontal to vertical polarization, or vice versa!)

Christofanelli came back optimistic that in spite of the enormous distance between dish and house, the system could be made to work. One reason was that a new company, Earth Terminals, was into full scale production of Clyde Washburn's revolutionary receiver which featured a separate two-stage down-converter with an output I.F. frequency of 70 MHz. Line losses are vastly lower at 70 MHz than at 3.7-4.2 GHz, so getting adequate signal into the receiver (located in the Josephson's house) would be "duck soup".

And since the receiver was in the house (and not 700 feet away) it was a snap to operate by remote control.

A couple of months after Christofanelli's visit (it was now February or March of 1981) a letter arrived from George Ashley, president and proprietor of Tropical Electronics. The light weight polar mount which the dealer had insisted on supplying for the antenna had collapsed during windy weather. The 1400-pound dish had crashed unceremoniously against the concrete foundation, cracking one of its parabolic ribs and denting an aluminum panel.

While the antenna-crash was a serious setback, Tom still wanted to proceed with the planned corrective work, albeit now with a properly designed mount.

The repair and re-installation of Tom Josephson's antenna were scheduled for October when it wouldn't be quite so hot. At the same time I would assist in the installation of another 6-meter antenna at the home—also in Nassau—of a Mr. Sam Jackson, a businessman who loved "a sweet technical challenge and the chance to attack it with total competence", according to his wife, Aletha.

O'Hare Airport, Chicago—October 21, 1981. The second chapter of my Saga in the Bahamas began as the Eastern Airlines L-1011 taxied toward the runway. Given the cold, damp weather that had descended over Northern Illinois I should've been overjoyed to have a few days of warm sunshine in Nassau.

On the one hand I was looking forward to showing the Josephson's how good satellite TV can be, and to helping Sam Jackson do a "textbook" installation.

But there was the nagging uncertainty about how to go about repairing the Josephson dish. Replacing a major structural component—in this case a parabolic rib—might require a complete tear-down and subsequent reassembly of the antenna. To Sam and his wife, Aletha, who picked me up at Nassau's airport that evening, I must have seemed awfully preoccupied.

Nine A.M. the next day. The Tropical Electronics van



Blown Over - The dealer had used a light-weight polar mount for the 1400 pound dish and it had collapsed in windy weather—it had to be reinstalled!

with Mack Sampson pulled up in front of the Pilot House Hotel where I was staying. We had a date at the Josephson estate. Tom was probably sharpening his “needle” in case the dish repairs turned into the complete overhaul I hoped wouldn’t be necessary.

The repair job (done according to a step-by-step sequence that had been planned back home one night when I couldn’t sleep) took only three hours.

When Bob Christofanelli arrived to “do” the electronics the repaired dish was ready to be lifted up onto its new mount. In the two days prior to Christofanelli’s arrival, I helped re-paint the Josephson dish to Tom’s specifications; and in the evenings I helped Mr. Jackson finish his 6-meter dish. When we were done, Sam’s dish had a verified “peak error” accuracy of plus-or-minus 3/32 inch; equal to the accuracy verified on the Josephson dish a year earlier and re-verified during my present visit.

With that kind of accuracy these dishes would have *no choice* but to deliver maximum performance at 4 GHz; and later (in 1986 or so) with the future Ku-band (12 GHz satellites).

A “Cape Canaveral” atmosphere prevailed at the Jackson’s the night that we “fired up” his TVRO. Using an inclinometer on the backside of the big dish, Sam told me when to stop cranking the jackscrew which adjusted the dish’s “tilt” above the horizon. (In 1981 it cost more to motorize a large dish than the dish and electronics combined!).

The main source of “premium” programming in 1981 was a bird called Satcom F1, located at 135 degrees west longitude; just one degree west of Galaxy One’s orbital assignment today.

Satcom F1 was nearing the end of its seven-year “design life” and although it continued to faithfully serve both cable and home TVROs across the USA it was becoming a tad feeble. I had seen a couple of sloppily-installed 7-meter “condo” TVRO systems in Miami have difficulty with F1’s weaker transponders. F1 would be weaker—on all transponders—in Nassau.

Sam Jackson and a number of friends—several of whom I had come to know during the past few months due to ongoing and often lively correspondence—gathered around a 17” Sony TV which had been placed in the Jackson’s carport near the dish.

Standing beside the bottom of the big dish I grasped its rim and pulled until it was aimed to where the “Findex” satellite plot showed Satcom F1 would be, as “seen” from Nassau. The picture practically exploded on the TV screen, the way it always does with a large, precisely constructed TVRO antenna.

“You’ve got it—you’ve GOT it!” How many times have I heard those exact words shouted when I get the first satellite video for my customers? From “Tuktoyaktuk to Tegucigalpa” I’ve heard those words and the thrill’s still there.

After much handshaking and backslapping, we sat down under the star-filled tropical sky and rustling palm trees to watch the WGN Evening News.

Only on transponders 10 and 22 was there any noise to marr the otherwise perfect video, and that was due to microwave interference from the nearby Bahamas Tel “troposcatter dish” aimed toward Florida. The interference wasn’t serious and could easily be tuned out.

The next day Mack Sampson, Bob Christofanelli and I would “fire up” Tom Josephson’s TVRO. Tom ambled out while we were placing the TV on the ground between the antenna and the swimming pool. “Well, do you think you’ll have that bloody thing working while I have some breath inside of me?” he bellowed.

“You are so cantankerous, you’ll be here to see this thing work if it takes us twenty years!” I bellowed back at Tom. Apparently shocked at my reply, a servant, who was bringing a tray full of sandwiches and tea nearly stumbled into the pool.

My grand plan for the big “turn on” went this way. The TV would be sitting on the concrete pad, under the big dish. We would invite Tom and Mrs. Josephson out to see Satcom F1 pop onto the TV. Then after the anticipated exclamations and backslapping I intended to saunter the five or so feet towards the pool and throw myself in, fully clothed, while saying “All in a day’s work”.

Well, it started to rain. While we were eating, clouds that had been hanging to the south built up over us. We carried the electronics and our food down to the pump house. At best, precision finding of Satcom F1 would be more difficult with the TV over a hundred feet away. And out of sight!

When you’re alone by the dish and getting shouted messages from somebody else, who is getting messages from a third person stationed by the TV, well, there are better ways to do it.

It took a little longer than the normal 30 seconds to find F1, given the above circumstances. Earthstar’s Bob Christofanelli had the receiver tuned to transponder 12. And then the unexpected. After finally locating “TR-12”, we found we had a basic case of terrestrial microwave interference.

The Josephson TVRO was located smack-dab in the Bahamas-Tel “microwave path”. The receiver’s AFC was be-



Bahamas

Picture Perfect - The completed dish and its reflection in owner's pool—it was at the forefront of technology, for 1980.

ing overridden and so it couldn't "lock in" in TR-12 or TR-20, as well as five or six other transponders. Until microwave interference filters were subsequently installed, the Josephsons would have to manually tune to each channel.

The interference aside, an hour later the receiver was in the Josephsons' master bedroom. The whole family was in the bedroom watching sharp, clear video from Satcom F1.

Truly, the technology available in 1981 had been stretched to unprecedented heights (and distances) to deliver studio-quality video 800 feet from dish to receiver. Here indeed was a system that will function perfectly long after cantankerous ol' Tom stopped being cantankerous.

What would happen after the "new" wore off the Josephson and Jackson TVRO systems? Tom Josephson's son, Donnie, wrote in his 1985 Christmas card: "Can you install TVROs in England? Several of Dad's school chums (from England) were here recently and the sight of all those channels of crystal clear TV just boggled their minds. Totally!"

Sam Jackson and I continue our correspondence to this day. What are Sam's observations about satellite TV, almost 2,000 miles away from the Central USA where most U.S. birds are "boresighted"?

July, 1984. "... My daughters no longer have to manually turn the antenna, as I got round to motorizing both the azimuth and elevation functions. Although neither "az" nor "el" motor have brakes, I find that I can anticipate when to stop. Oh, sometimes I overshoot a wee bit with the azimuth motor and then have to come back a little, but the inconvenience is minor. . . ."

September, 1984. "... Bob Cooper described a means for measuring signal voltage at the 70 MHz output of the receiver consisting of a 'carrier level detector' and a digital multimeter. On 'MTV' I obtained a reading of 42 mV! But of course I get over 100 channels of sensational TV. My next acquisition will be a monitor TV so I can bypass my modulator and extract pure 'baseband' video from my receiver's 'video output' jack. Then I'll find out what's *really* there to be seen!"

September, 1985. "... The Raydx and Paraclipse antennas have gained wide acceptance in the island TVRO marketplace, producing very good video on many satellite transponders. Of course larger antennas are still needed in the Southern Caribbean and South America. . . .

. . . Well, I 'did it'! I purchased that studio monitor I had

threatened for so long to buy. All I can say is that only a select few human eyes have seen video this good! The most delicate nuances of color and texture have been revealed at last. It is as I had hoped, and still I am surprised! Over 100 channels like this—it's almost sinful!"

February, 1986. "... I do not think that the trash HBO and Cinemax show warrants the cost of a descrambler at this time (\$395 U.S. plus 60% customs duty); and so many of us are looking for other options just in case the evil spreads.

"On Ku-band there is only SBS-3 with NBC within our purview. Next month should let us know what if anything RCA's K1 and K3 satellites have for us. There is a rumor that HBO is out to undermine us by buying out a number of transponders for scrambling. These greedy people are determined to take over the home satellite TVRO industry. . . ."

"... Proper enjoyment of Intelsat and Russian Gorizont bird requires a multistandard monitor. Mark Long's firm in Tennessee (Solar Electronics, 156 Drakes Lane, Summertown, TN 28483) is selling a 14-inch JVC monitor for about \$700, which has SECAM (for the Gorizont birds), NTSC for US-Canadian programming, PAL . . . but none of the areas that use the straight PAL is accessible to us in the Caribbean. What we need is PAL-M for the exquisite video that is abundant from BrazilSat at 65 degrees West. . . ."

"What really intrigues me is your proposed modification which not only enables me to quickly interchange my domestic and international feeds, but would actually *further* enhance the antenna's performance! (Have you also discovered how to pack two gallons of ice cream into a one-gallon carton?)"

March, 1986. "... The modifications you described will soon be ready. You must come to see the results. . . and Halley's Comet. What a sight it is in our southeastern sky!"

"Dear Sam," I am writing. . . . "My camera and binoculars are packed. It has been a long winter. . . ." ❖

NOTE: If you have a question to ask or an experience to share about TVRO antennas, write a short note to Jim Vines at P.O. Box 448, Monee, Illinois 60449-0448. Vines can (sometimes) be reached by phone at 312-534-0889.

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ALCOA

Is It Safe To Buy A SECOND-HAND DISH?

Shopping For A Used Private Earth Station

by Doug Stevenson

Just about any classified ad section of a newspaper or Traders Post type publication will have four or five ads for used satellite systems for sale. This can be a relatively inexpensive way for someone to acquire the benefits of satellite TV, or it can be a rather expensive burn. By being a careful shopper and knowing what to look for, it may be possible to get a good deal and save some real money.

People sell their systems for a variety of reasons. Often it is because they are moving and do not want to bother with moving their dish or just don't have room for this large item. Sometimes it's because they need money fast and this is one luxury item they can sell and recover a large chunk of cash.

People have been watching satellite TV for several years now and there are thousands of different dishes, receivers and motor drives that have come and gone. Some are still in business and many have fallen by the wayside. This is an important thing to check when shopping for used equipment. Is the manufacturer of the dish and other components still in business and able to supply replacement parts or provide service on the electronics? Nowadays, there are several companies that say they will repair any receiver for a flat fee. However, many times the microwave circuitry can involve exotic, hard to get parts, or perhaps the microprocessor chip that controls channel selection and memory functions was custom designed and is no longer available. A schematic diagram can sometimes be an absolute must for troubleshooting and repairing complicated equipment such as this, and one can only be gotten from the factory.

If you want information about your receiver and motor drive, copy down

the model name, model number, serial number, the company name, address, and phone number if it is there. A direct call will tell you if they are still in business. As everyone who has bought a car knows, a company can still be in business but produce a few models that were out and out lemons. Manufacturers are constantly changing the designs, sometimes to cut costs. Even a company with a great reputation can get squeezed by the competition and put out a unit that has cut too many corners resulting in a loss of quality. One good way to find out how a receiver really performs is to ask a dealer who handles that product line. Ask him what his failure rate is on the particular item you are interested in and what kind of typical service problems he has encountered with it. Even better is to talk to a few of his customers, the users. How are they satisfied, what kind of service problems have they had? You will find that there are some brands that are reliable and always a good buy.

Probably the most common receiver out there is the R.L. Drake line. Drake has sold more receivers to date than anyone in the business. The original ESR 24 produces some of the highest quality video and audio that you will see on any receiver anywhere. Another company that was an early leader in TVRO is KLM. Although their receivers were originally some of the cheaper units available, they produced high quality dependable video. That's not to say that they never break, anything electronic will go out sometime. But service and reliability go a long way towards keeping some names still with us.

Motor drives probably require more service than any other piece of equipment in your system. They are outside

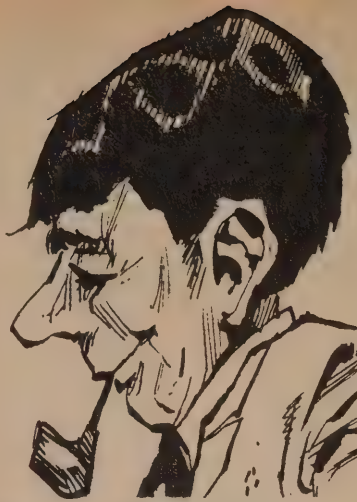
doing the work, exposed to the extremes of ice and snow. If you can, run the motor drive out to its full extension and examine it. Does it move smoothly? How rusty is it? How do the gears sound? Are they running smoothly and lift the dish easily? Or is there a grinding sound and does it have trouble lifting the dish? Early motor drives had just a manual control to move the dish east or west with no indication of where the satellites are or where the dish is positioned along the arc. Some old models even used 110 volts AC or DC motors which they adapted or retrofitted onto the dish. Generally, in all cases avoid a motor drive that uses 110 volts. This creates a potential shock hazard in an area that is exposed to water and unsuspecting children. Most later models of motor drives use a 36 volt DC power source. This significantly reduces any potential danger.

The next stage in the development of motor drive systems was the digital counter. Starting with number 1 at the bottom, the numbers count up as the dish moves. A chart is made with different numbers corresponding to different satellite positions.

In an effort to make the satellites easier to find, manufacturers turned to computer IC's to provide a memory that could recall each satellite location. These programmable systems are much easier for the average person, who can go where he wants just by punching in the appropriate satellite name and number. Along with these improvements can be certain drawbacks. Computer chips are very sensitive to voltage changes or high voltage spikes, often caused by thunderstorms or by heavy machinery or motors (such as on a large air conditioner) turning on. Certain brands are most susceptible to this

Continued on page 46





Used Dish

kind of problem and this would be something to check into. Find out what the procedure is for entering the satellite locations into the memory and how long the memory will last when the power goes off. Some brands lose all memory when there is a power outage, while some claim their unit will keep everything secure for seven years!

The dish is the heart of the system and will do much to determine whether you got a good buy or not. Early dishes were usually very heavy duty and sometimes overbuilt. Often the mounts were homemade and cannot be easily retrofitted or updated to a new style motor drive. Today most dishes have been streamlined by the use of mesh and lighter mounts. Many motor drives currently in production do not have the torque to lift extremely heavy dishes. Inspect the mount and all steel parts for rust. Will there be any difficulty taking the dish apart because the bolts and hardware are extremely corroded? Check the pivot points on the dish. Does the dish move easily through the arc? Are there bearings? Bearings at the pivot points indicate a little extra care and thought in the dish mount design.

Fiberglass dishes tend to show signs of age more than aluminum antennas. Inspect the dish surface for hairline cracks or bubbles. Water can enter a crack and then in midwinter turn to ice doing further damage. Another condition fiberglass dishes are susceptible to is warpage. This means that the dish parabolic loses its shape. Rather than being perfect in all directions, it will have a slight bow or twist like a potato chip. To check a dish for warpage, site across the lip of the dish until both sides seem to be in the same plane. All surfaces should line up evenly. If one side juts up (usually one quadrant)

above the others, that is a sign of warpage.

This can often be remedied by loosening the bolts around that area, then physically pulling it back into shape. A slight amount of warpage will not greatly detract from the dish's overall performance, but a dish that is severely out of shape will have an unwatchable picture. A surefire way to check a dish parabolic is the string test. Stretch a string across the center of the dish from one side to the other. Stretch another string across at 90 degrees to the first string. The two strings should lightly touch in the middle. If there is a large gap between the two strings, this is an indication of warpage or a dish that is out of round. Even a metal dish can be warped, usually due to improper assembly or construction of the dish on an uneven surface. This usually can be remedied as stated before by loosening the bolts and then tugging the dish back into shape. In extreme cases it may be necessary to disassemble the dish and start over.

Almost all dishes have a piece called the center feed which supports the LNA (low noise amplifier) and the polarization feed horn. These can be a tripod support system or a one piece unit coming from the center of the dish. Generally the tripod method offers sturdier support but the button hook works fine and is usually more aesthetically appealing. The distance from the center feed (the concentric rings with an opening in the center) is an exact distance and must be right to get a good picture. Be sure you have this measurement before disassembling the dish to move it.

Most of the satellites you will be tuning in have 24 channels or transponders. These are divided into two sets of twelve known as vertical or horizontal polarity. To receive one polarity or the other, the signal sent into the LNA must have the proper orientation. On the first systems that were installed, each polarization was received by turning the LNA from side to side with an Alliance TV antenna rotor, the kind used to turn a VHF antenna to receive different stations. This motor turned very, very slowly and did not offer much in the way of fine tuning. This is an important thing to check when looking at a used system. If the system utilized this type of polarization system, you can assume it is between 3-5 years old and you will need to purchase some more modern polarization device.

The most common polarization cen-

ter feed is produced by Chapparel and it utilizes a small servo motor which turns a small probe inside the feedhorn. The feedhorn is the piece out in front of the center of the dish with concentric rings and a center opening. The dish reflects and concentrates the microwave signal to this opening. The probe inside turns from side to side depending on whether you want to watch vertical or horizontal polarized stations. Most modern receivers have a built-in interface for this style polarator and will tune in each station automatically or with the push of a button. Usually a fine tune control is provided also. Now there are several companies that produce similar feeds that are all interchangeable.

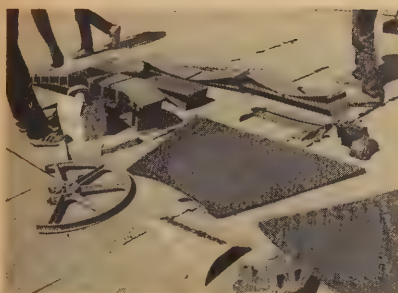
The dish will probably be supported by a section of pipe from 3 to 6 inches in diameter set into concrete. Unless you plan to dig out the pipe, you will need a new pipe for the installation at the new location. You can assume that there is about 3 feet imbedded in the cement and add to that, the amount that is above ground, usually 4 or 5 feet. Sometimes it is necessary to raise the dish above the trees or other obstructions in order to get a clear view of the satellites. Check your site ahead of time so if needed, an extra long pipe can be purchased.

There are several reasons why you should expect to purchase a used system for a good deal less than what the seller paid for it. The dealer sells his systems to first time buyers, people who want new equipment. The customer does not want to pay a retail price for used equipment, so for the dealer, there is very little demand for used electronics or dishes.

On systems over a year old, the manufacturer's warranty generally will have expired. Since you are purchasing the system uninstalled, you do not get the benefit of the dealer's guarantee. You are not paying an installation fee and you may also have to disassemble the dish to move it. This should all be subtracted from the retail price that was originally paid for the system. System prices have gone down nearly \$1000 over the past year, also significantly reducing the cost of a used system. The careful shopper, who knows a little bit of what he's looking for, is likely to find a really good buy. You can enjoy all the benefits and expect the same quality picture as your friends and neighbors for half of what they paid. You can stand back with a smile on your face and know you got your money's worth! ▀

OUR NEW DISH

*It's Time To Upgrade Reception
At Our Home Office*



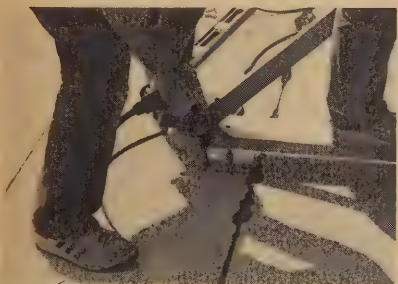
All The Pieces -

A Paracclipse CD 12 footer.

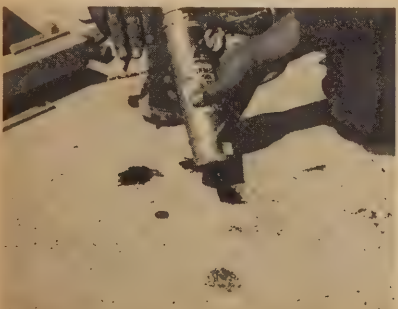


Finding The Beams -

Securing mount to roof.



Drilling - 16 bolts secured dish to roof.



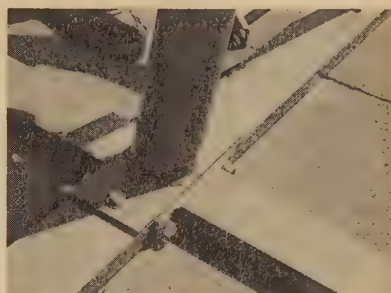
Rainproofing -

Must be done BEFORE inserting screws.

Home Satellite TV magazine is always looking into new equipment and installations. Lately, we've been hearing a lot of horror stories about roof mounts and the difficulty with installing large dishes. We decided to find out the truth.

The antenna was a new Paracclipse 12 footer. Since our headquarters is on the California coast, a larger dish is a necessity. Although we could have

Continued on page 48



Bolted Together - Mount takes shape.

Roof Mount - Our crew, Richard Martinez, Jim Clark and Jerry Thomas of "The Satellite TV Store" get it straight.





Assembling Ribs - *The first step.*

New Dish

done all right with a 9-footer, we decided to push it with the big 12 (CD).

Paraclipse makes a "show mount" which we adapted to the rather flat roof of our building. For our crew, we picked the boys at the SATELLITE TV STORE, 6353 Ventura Blvd, Ventura, CA. Between them they've done hundreds of installations and had dozens of years of experience (some of it for the armed forces before moving into the satellite business).

The biggest problem was getting the antenna to the roof. We only had a skylight opening on the second floor that was 2 ft. by 2 ft.! Yet, the entire Paraclipse (in sections) went up through this opening.

Assembling it took about 2 hours and was a breeze. The mount was easily installed in another hour. Getting the dish on the mount and aiming took a while longer. Then there was running cable through the building down to the conference room. The work was spread out over a couple of days, but could easily have been done in one.

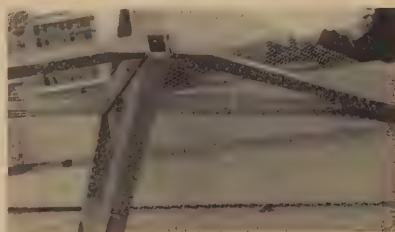
We got a perfect, beautiful picture the first time out. Roof mounts difficult? Not this one. Big dishes tough to handle? Hardly? Our new dish works great!



At The Hub -
Ribs join central mounting.



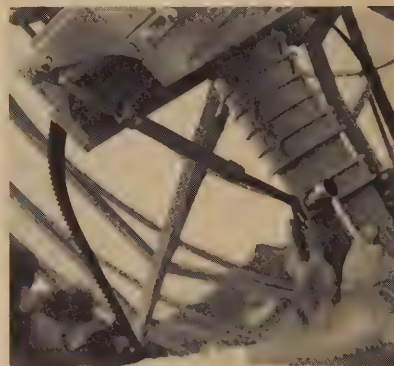
Taking Shape -
It finally looks like a dish!



Meshing -
Mesh fits on and between ribs.



Splining -
Plastic spline helps hold mesh.



Adjustment Screw -
It determines angle of dish.



Horizon-to-Horizon -
Uses a rubberized track.



Securing Head - *Torquing the bolts.*



Raising Dish - *It took all hands!*



Getting the right angle -
right the first time!



The First Picture -
Cameron Beaton tunes it in.



On Mount - *The dish is finally up!*



Installing LNB - *From Avantek.*



Crew's Headquarters -
Satellite TV Store, Ventura.

Job Well Done - *The 12 foot Paraclypse for Home Satellite TV Magazine,*







MEDIA ROOM

FURNISHING YOUR

Furniture Just For The Videophile

BY SCOTT MEHNO

Just about every dish owner is aware of the satellite creed. You know the line. It's about as well known in Washington these days as the Boy Scout oath: "Every citizen has the right to receive TVRO signals in the comfort of his own home." Well, now that the legal aspects are being resolved, many dish owners are tackling the "comfort" issue. That's right, all of you satellite buffs out there are finding out that 'where' you view your programming is as important as 'what' you view.

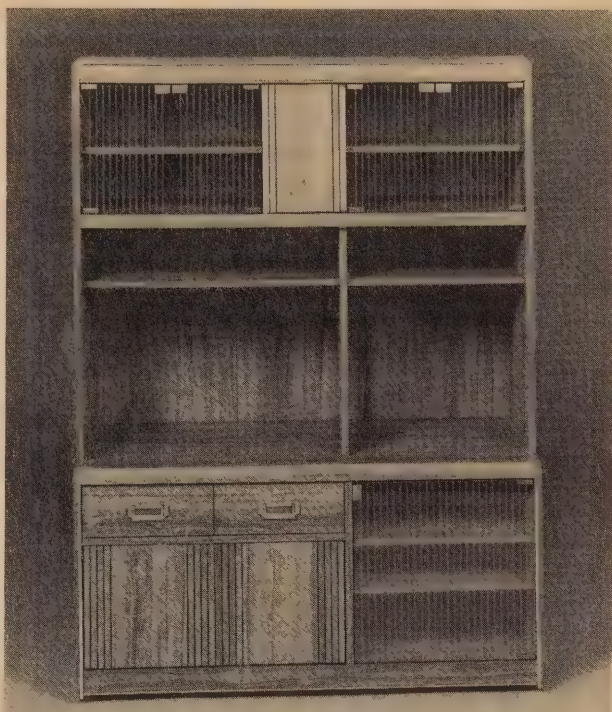
The high-tech media room is fast replacing 'den' as the comfort catch word of the 80's. If all this sounds still a little too Buck Rogers to you, don't turn the page yet. Recent gains in the furniture design and improvement in the size and shape of satellite equipment have formed a common bond between the people who make the systems, and the people who sell you what you watch it on. We may still be a few years away from living quarters designed specifically for TVRO, but important steps have been taken to make your TV habit more than just a 'coffee-table' experience.

One company who's keeping their eye on your video adventures is the Bush Company, a New York manufacturer. "Our goal is to design furniture that has sufficient storage and shelving space so that the viewer finds it both functional and versatile," says William Schaffer, vice-president of marketing. "We're finding a lot of our customers are people who own a satellite system and want to fit it in with their other electronic hardware." Schaffer stresses that the units Bush creates are not designed to be the star of the living room environment, but an essential part of it.

The key, he stresses, is integration of the TVRO equipment and the furniture as well as the furniture integrating

Ultimate Entertainment Center - High performance modular furniture designed to keep pace with high-tech video and sound creates a dream setting. The new furniture, now becoming available countrywide, provides not only ease of use and system accommodation, but also beauty. Photo courtesy of Custom Woodwork & Design, Inc., Bedford Park, IL.

Media Room



Basic Entertainment Unit - It will include room for a TV, stereo, satellite receiver system and VCR. This unit from Gusdorf Corporation of St. Louis accommodates all this in an eyepleasing design.

into the individual design of the living room. "Our goal is to maximize the utilization of the equipment in the minimum amount of furniture space." Bush offers high and low end product, all geared toward this goal.

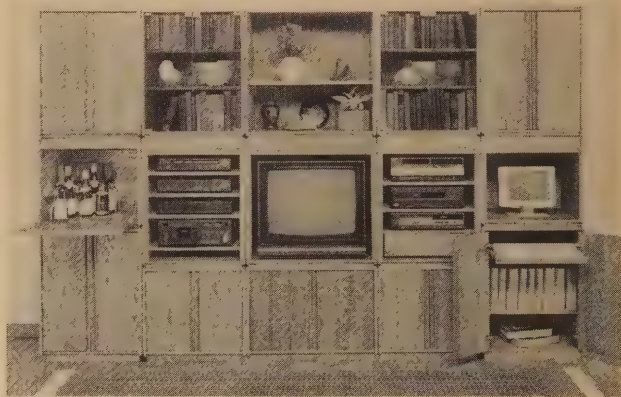
A lot of manufacturers feature "knock down" units, which are easily assembled by the dish owner. The least expensive knock down styles can start as low as thirty dollars for your basic TV table. Most use a ground-up wood substance, such as particle board, for the furniture's core. An artificial 'finish' is often applied with a print grain designed to resemble a finer wood grain. Most low end models utilize an oak-grain combination with a vinyl laminate. The more expensive assemble-yourself units incorporate real wood.

Bush's low-end line starts with their solid wood frame video cabinets, which retail for \$150. For forty-nine dollars more they make available, as part of their Artisan collection, solid wood frame oak cabinets. Their combination cabinet which can contain both your video monitor and your receiver is made available for \$339. All units have an "upscale" look and include video cabinets with glass doors, slide out shelves, and accessory shelves.

Other companies that produce furniture similar to the



Matching the components - Many satellite consumers need furniture that not only matches the environment, but also accommodates their system. Bush industries of Jamestown, NY offers "centers" that do just that.



Mix and Match - The modular approach allows the greatest flexibility for the viewer. These components are from Custom Woodwork and Design.

Bush line are Furniture Concepts International, Gusdorf, O'Sullivan, and Custom Woodwork and Design of Bedford Park, Illinois. A lot of satellite consumers indicate their biggest need in furniture are units that not only match the environment, but that match the components, as well. The custom-made hi-end look is becoming more popular with those customers who constantly add on to their systems, as well. Spencer Kalker, vice president of CW&D says a trend towards designing with a "satellite-type" customer in the driver's seat is now developing.

Dish owners are indicative of the new electronics consumer in general, who want easy access and easy accommodation. "Our units can include everything from a tape drawer to hidden wine cabinet. A customer can also custom order something if he wants," says Kalker. Additional storage space can also be added to the units at the customer's request. Some of the higher end systems include a drop down bar and a 6 foot video screen that serves a dual purpose as a bookcase when not in use. "When we talk about integrating your TVRO system into the living room, we're not kidding," says Kalker. "The CW&D line starts at \$100 and can run all the way up to \$6000.

Skeptical dish owners should take note that the high-end



Large Screen Furniture - Shelves and openings to match the new big screen TVs are now the rule. From CW & D.

price does not mean your den will be transformed into some James Bondian palace. Kalker stresses that comfort and practicality are just as much a part of high-tech furniture as your favorite easy chair. "We have a motorized cabinet with a scissor lift that can be mobilized to lift your AV system out of sight if necessary. We want everything to blend into your living room, not obstruct it." The creativity of furniture companies has also caused video hardware manufacturers to get into the act. Dish owners are discovering that important innovations are now being made in the hardware that got them interested in TVRO in the first place, the TV set.

It is now being considered as important a piece of furniture as the antique lamp or the precious dining room set. The added aesthetic emphasis on the video monitor, and/or screen seems to be exciting not just the status conscious dish owner but the hardcore videophile, as well. Advances made in projection TV design has caused a lot of TVRO buffs to make this the centerpiece of any media-room consideration. Projection TV as a whole did very well in '85, almost 200,000 sets were sold nationally. That number is expected to increase about 25% this year. The units which retail for about \$2000 are designed specifically to integrate

into the homeowners' already existing electronic hardware.

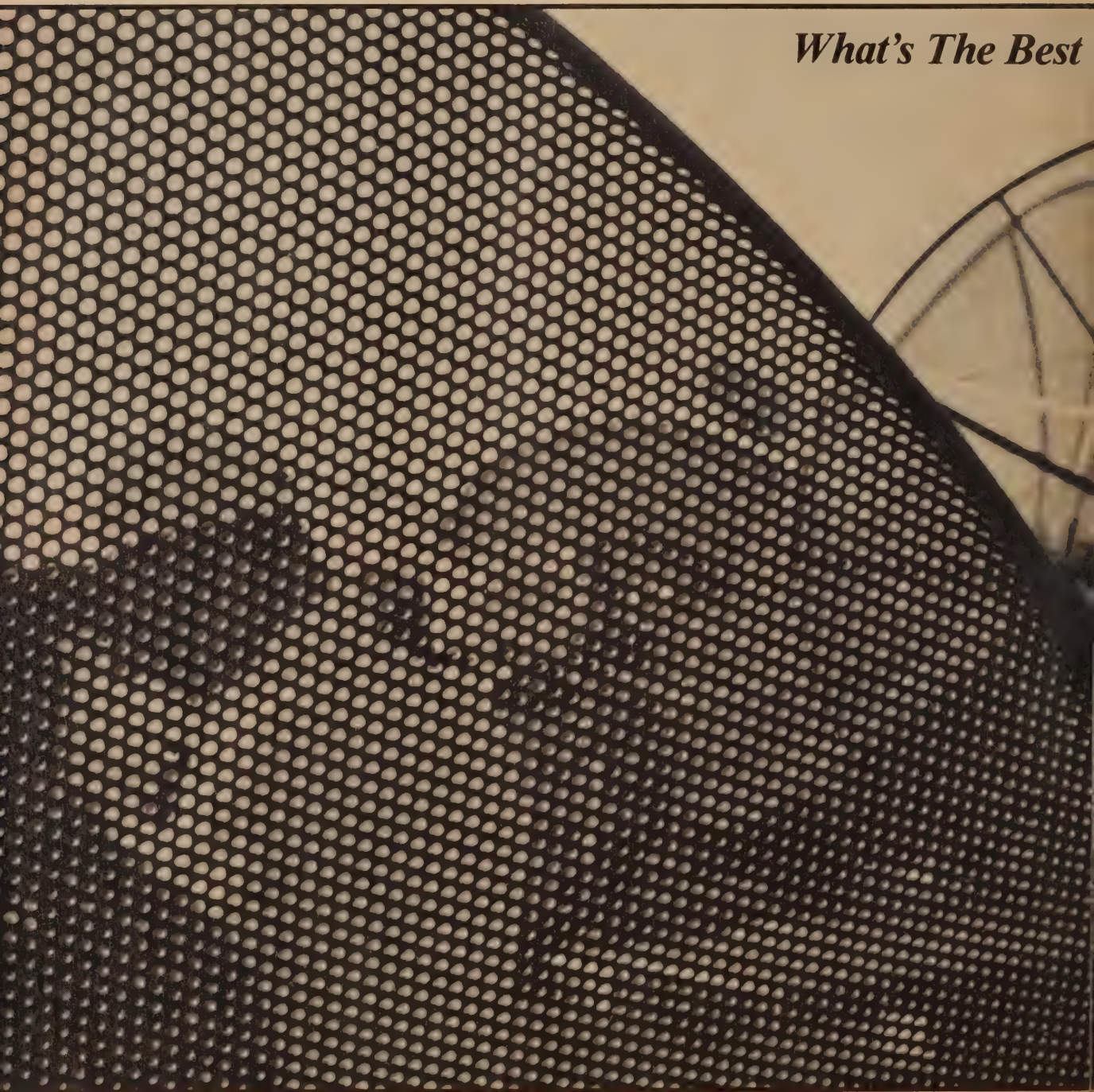
Design advances have also been made in standard monitors. These alterations, geared mostly to an increase in size, have also become a popular centerpiece to the TVRO viewer's media room needs. The 20 to 27 inch screens are now commonplace among system owners. Many of these come as "table-top" designs. Zenith, which is mostly responsible for this popular innovation announced recently that sales have increased some 80% for tabletops 20 inches and over. Their recent line of 20 inch tabletops with silver-toned cabinets, and black lacquer or wood grain veneer has been one of their most popular units. They also sell a table top monitor/receiver combo, which starts at retail price in the \$700 range.

All of these innovations add up to progress for the satellite buff who wants to not only keep up technologically, but aesthetically as well. The concept of a media room with gadgets and buttons and a high-tech personality has now given way to a comfortable, affordable viewing room. A place where the user not only calls the shots, but where the furniture for such hi-tech systems can co-exist with that cozy old living room chair you've sworn to re-upholster. Both have a place in the comfortable world of TVRO. ▀

THE RIGHT STUFF For Your Dish

by Phillip Patterson

What's The Best



What an irony. You want a home satellite system so that you can make all those decisions of what to watch from among the scores of programs and channels that are available. But before you can indulge yourself in all those choices, you have to choose between the hundreds of antennas (popularly called "dishes") available—a choice you might not be well-equipped to make. And while your dealer will be helpful in getting you the right size antenna, he may not be objective in helping you to choose the right composition for the antenna, particularly if he sells only one type.

Although the problem may at first seem bewildering, the good news is that all three of the popular materials—aluminum mesh, fiberglass and steel—perform well as raw material for satellite antennas. "There's clearly no one best

material for antennas or there would be only one," said Bob Cooper, the pioneer of home satellite television in a recent interview. "There is no advantage of one material over another as a family and anyone who says so is exhibiting a marketing attitude," he added.

Two things are important in the selection of material for satellite antennas: the ability to hold a parabolic curve and the ability to withstand time. Each of the three popular materials used today possesses those qualities. Remember, the antenna is simply a reflector. Its sole function is to bounce signals off its surface to the electronic parts of the system.

And even though each material mentioned seems to perform this simple, yet quite important task well, each material does have its supporters who feel that it is the "best" material for the job. Since you want to make sure your antenna is made of "the right stuff," we'll look at the claims made for each of the three popular compositions. But first, let's look at three forces at work in the marketplace that have given us so many choices.

The first market force on dish composition is cost. Not all materials cost the same in raw form. Furthermore, differences emerge in the cost of the manufacturing process. Later, more differences emerge as weight becomes a factor in shipping. Years later, durability has to be considered as different compositions perform differently under stress in the field. No one material—fiberglass, aluminum mesh or steel—can lay claim to being the least expensive in every area, which is one reason why we have a variety of dishes.

A second market force adding to the variety of dishes is technology. While it is widely known that Ku-band will be shrinking the size of dishes, what is not as widely known is that manufacturers are having to look again at tolerance (the correctness of the curve) to accommodate the new, shorter wavelengths. Dishes today have to have twice the accuracy they had for C-band viewing. Similar claims are being made about the VideoCipher by MA-Com which descrambles signals such as HBO. Manufacturers are being told that the antenna must be extremely accurate to deliver a signal which the descrambler can read. The material that meets these rigid standards will survive, the material that can't will no longer be manufactured.

Finally, the marketplace is demanding that dishes have an aesthetic quality that once was lacking in the industry. In the beginning all parabolic-shaped antennas were made for industrial customers, such as cable companies or television stations. Accuracy and durability were the only considerations. But when the dishes moved into the backyards of America, how they looked became as important as how they performed. Jim Atkinson, national sales manager for KAULtronics, Inc. says that women were an important factor in the change. "The hobbyist didn't care about what the antenna looked like as long as it worked. But now it's a family decision and since Mom has to look at it all the time, they're going with a more attractive dish such as mesh."

So the industry has followed the flow of three moving



Antenna Material?

All Kinds - Variety is the rule with dish material. It includes aluminum, fiberglass and steel. It can be solid, rolled, mesh or perforated. Ultimately, however, it's not beauty that counts, but instead picture quality.

The Right Stuff

forces—the desire for a low price, the need to accommodate the latest technology and the ability to be aesthetically pleasing. What we will see is that no one dish composition has captured the market on all three points, which explains precisely why there are different compositions. Now let's look at each material separately and see what claims and counterclaims are made about each.

Steel Antennas

Although steel lags far behind fiberglass and aluminum in popularity for satellite antennas, it still does have some advantages. Its primary distinction is durability at a low cost. Steel is three times heavier than aluminum, yet costs only about a third of what aluminum does, says Ray Tammaro whose firm, Acker Industries, Inc. supplies 400,000 pounds of steel and aluminum to antenna manufacturers every month. In addition to the lower cost of raw materials, steel is easier to work with, particularly in the welding process. It is more resistant to hailstorms, which can often dent the softer aluminum dishes.

Acker Industries actually shipped more steel for dishes than aluminum in 1984, Tammaro said. However, the shift has since moved back to aluminum in a dramatic way. DH Satellite, which produced over 10,000 units per month in 1985, made four aluminum dishes for every one steel dish, president Franklin Weeks said in a 1985 interview. Most of the steel customers were drawn to the material by the low cost, he added.

Steel antennas have two drawbacks. First is the problem of rust. Any area of the country that has saltwater is a bad area to have a steel antenna. However, KAUL-tronics, which manufactures 23,000 dishes a year from its Richland Center, Wisconsin plant, feels that there is a market for stainless steel antennas and offers three sizes of solid, stainless steel dishes. "There are still dealers out there who want a high quality, accurate antenna like stainless steel," said Atkinson. He cited the finished product's weight and durability as being advantageous over aluminum, which the company also makes. He also added that stainless steel needs no protective coating (such as paint) like aluminum does.

A second problem with steel dishes is the shipping weight. Tammaro says that a 10-foot dish made of steel will require forty pounds of metal, while the same size aluminum dish will require 20 pounds of metal. That ultimately results in higher shipping costs.

However, for much of the country where neither weather or distance from a manufacturer is a hindrance, steel is a viable alternative material that is often overlooked by the purchaser. Different types of steel material—mesh, expanded mesh and perforated—have also made the steel dishes aesthetically pleasing without sacrificing picture quality. Bob Cooper said of steel dishes, "If the infrastructure of a solid steel dish is designed correctly, it will be the longest lasting dish." This is one reason why steel has been the choice of a number of commercial applications over the years.

Fiberglass Antennas

Fiberglass antennas were the choice of commercial users such as radio and television stations long before home satellite antennas became popular in the early 1980's. It was natural, then, that fiberglass would have an early advantage in the home antenna market, since the early manufacturers of home television receive-only (TVRO) antennas were also the commercial manufacturers. Weeks' firm, DH Satellite

of Prairie du Chien, Wisconsin is typical. "At one time, fiberglass was 95% of the market. I don't think it is more than 10% now. We got out of the fiberglass business because there was better opportunity in metal spinning," he said. But many firms saw distinct advantages in fiberglass as a material for the TVRO market and have remained in it to this day. One example is Odom Antennas, Inc. of Beebe, Arkansas, which has been manufacturing fiberglass antennas since 1979 and is one of the largest suppliers of fiberglass antennas in the U.S.

Owner Randall Odom has seen the evolution of the home satellite market and recognizes that aluminum mesh dishes have cut deeply into a market that was once dominated by fiberglass dishes. In fact, his firm introduced mesh dishes in 1985 and already they account for 85% of his firm's sales, according to Nancy Turpin, Odoms vice-president for operations. However, the firm remains committed to fiberglass antennas and feels that they will make a comeback.

"Many consider good-quality fiberglass antenna the Cadillacs of the satellite antenna market. Like Cadillacs, fiberglass antennas cost slightly more than mesh antennas, but at the same time they offer both quality and durability which warrants the higher expense," Odom said in a 1985 article he wrote on fiberglass antennas.

Odom fiberglass antennas carry a five-year warranty—a warranty that the company has only had to make good on "a handful of times" since 1979, according to Turpin. One Odom customer wrote to tell the manufacturer that the fiberglass antenna had survived Hurricane Elena in Mississippi even though the pole broke. "We don't know how long they will last," Turpin said. "We've only been in business for seven years. It is your opinion that they will last up to 20 years. We don't know because they haven't been out that long."

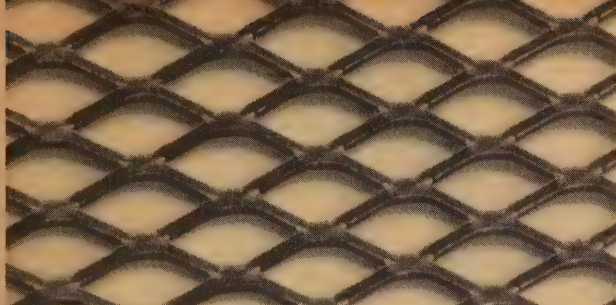
Perhaps the biggest advantages of a fiberglass antenna are accuracy and durability. Once a fiberglass antenna is shaped to a perfect parabolic curve and hardened, it will hold that shape virtually forever. But fiberglass dishes also have some problems. Bad products have hurt the industry severely, and harmed the reputation of the fiberglass dishes. Typical of the shoddy manufacturers were those who used other antennas to make a pirate mold rather than tool one for themselves. Another common shortcut was to rush the curing (or "kicking") process resulting in cracks and chipping soon after installation.

Then there are the problems associated with solid metal dishes—aesthetics and shipping cost. Fiberglass antennas, naturally, are solid and block the view of whatever is behind them. Unlike steel and aluminum which can go to mesh to eliminate the problems, fiberglass antennas must remain solid. They must also be shipped by truck, usually in a single piece or in four quadrants. Mesh dishes, on the other hand are often UPS shippable because of the nature of their panels.

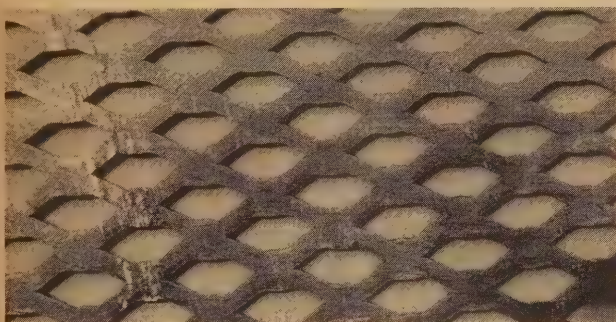
Aluminum Antennas

Aluminum antennas have captured 90% of the home market today, according to most manufacturers asked. Metal industry sources say that aluminum dishes use over 25 million pounds of the raw material each year. The reason behind the firm grasp aluminum has on the home market is that aluminum mesh and its counterpart, perforated aluminum, is aesthetically pleasing and easy to ship while delivering an acceptable picture to the consumer.

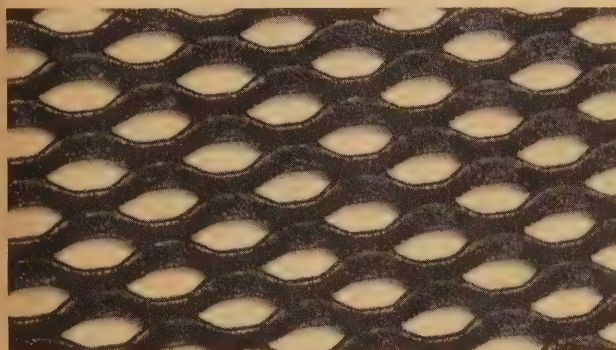
Although solid aluminum dishes are available, it was the aluminum mesh and perforated aluminum dishes, with their "see-through" qualities that made the metal the most



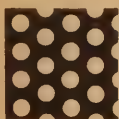
Before And After - Steel mesh (above) before it is rolled into expanded metal (below). Suppliers say the rolling process adds 20 percent more surface area while reducing the hole size.



Smaller - Wingard reduced the hole size on its mesh for better reception.



Ku Band Mesh - Openings are less than 1/10 of the wavelength, designed by Sea Breeze.



5/32" Staggered

.156" dia. (3.969 mm)
1/4" centers (6.350 mm)
18.5 holes per sq. in.
36% open



5/64" Staggered

.079" dia. (2 mm)
1/8" centers (3.175 mm)
74 holes per sq. in.
36% open

Left: Wingard's previous perforated aluminum pattern.
Right: Wingard's present perforated aluminum pattern.
Note that each has an openness of 36%.

popular antenna material today. As one salesman for American Metal Spinning, makers of solid and perforated antennas said, "I can't remember when I last sold a solid dish."

Aluminum mesh features diamond-shaped openings between 1/4" and 1/16" while perforated aluminum features round holes between 1/4" and 1/12" in diameter. They are often as much as 60% open, thereby reducing the problem of unsightliness. In addition, most of the protective coatings are black, further reducing the visibility of the dish.

Two serendipities occurred in the move to mesh and perforated aluminum. First, it was discovered that wind would travel through the mesh dish, rather than toppling it over, negating the problem of light weight somewhat. Second, the dish could be divided into eight or sixteen pie-shaped sections for compact shipping. Some six-foot dishes even came in a carry-out box with handle.

But how did they perform? Fine for C-band, but watch out if you want to view Ku-band when it becomes available, industry experts said. According to Ferry, "Old aluminum mesh worked fine for C-band, but it might not do for Ku-band." The difference lies in the nature of the wave, Ferry explained. "C-band is like a mist, while Ku-band is like a stream out of a power nozzle. While virtually any mesh could capture C-band, it takes a much tighter mesh to capture Ku-band," he said. That difference sent mesh and perforated aluminum dish manufacturers rushing back to the drawing boards last year to redefine the traditional patterns.

Winegard's solution is a good example (see illustration). They, along with many other manufacturers made the perforated holes smaller and closer together. The result is a pattern with a hole that is half as small, but with the same percentage of open area as before. And since openness is one of the important features of the perforated aluminum dish, the solution came at no cost to the aesthetic value of the dish. Many mesh manufacturers dealt with the problem by expanding or flattening the existing mesh pattern (see illustration). This process closes the diamond pattern in the mesh from as much as 60% open area to 67% closed area with no additional material necessary.

Before you purchase any dish with openings, check for yourself to see if it will be Ku-band compatible in the future. Industry engineers agree that the holes or diamonds should be less than 1/10;; (at the longest point in mesh) to fully capture the Ku-band signal. This is equal to a millimeter, a unit found on any dime-store ruler. If the holes are larger than that, you're looking at a dish that hasn't been redesigned to meet new technology and might be obsolete long before it would otherwise wear out.

Critics of perforated and mesh dishes point out that the dishes do not start out in a parabolic curve. In fact, they are manufactured flat and shipped flat in pie-shaped panels. They only take on a parabolic curve when inserted into or bolted onto the ribbed infrastructure. Can this be considered a true parabolic curve such as can be obtained by using a mold or by the spinning process?

Manufacturers of the mesh dishes point to engineering studies which show the efficiency rating of mesh dishes to be as high as any one-piece dish. They then turn the argument around and make the construction a point in the favor of the mesh dish. If one section gets a dent, only that section has to be replaced, usually within minutes, compared to the major catastrophe of a dent in a solid dish. Whether that advantage outweighs the shape problem is

Continued on page 59

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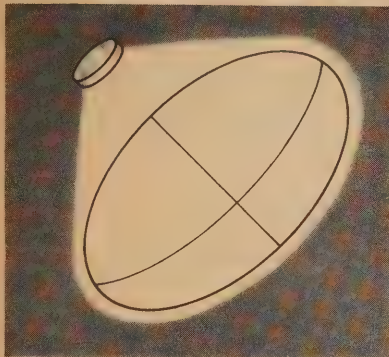
The Right Stuff from page 59

for the consumer to decide; however it is interesting to note that a number of mesh and perforated dishes are beginning to be shipped in their curved state, giving credence to the claim that the most accurate curve occurs in the manufacturing process and not in the assembly.

Conclusions

Perhaps the best conclusion is the same statement that

was made in the introduction: if there was one best "family" of antennas, there would be only one. Because there is no "best" type of dish, you must make a decision. And because the antenna is the most visible and most expensive part of the home satellite system, the decision is an important one which requires some thought. Remember: there may not be one antenna that is best for *everyone*, but there is one antenna that is best for *you*, and it will pay off in the long run if you take some time in finding it.

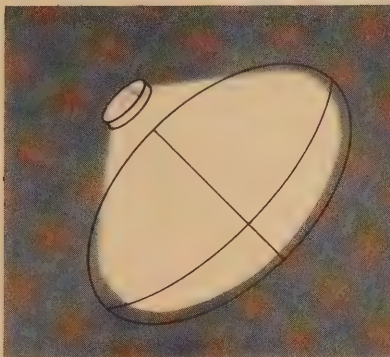


Over-Illumination

When the antenna f/D ratio is flatter than the feedhorn's optimum F/D ratio, or the feedhorn is positioned beyond the ideal focal length, over-illumination occurs.

The result is a poor picture and sparklies due to the excessive noise picked up from the perimeter of the reflector.

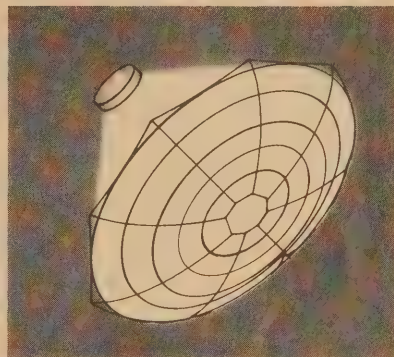
Illustration
Courtesy of Paracclipse



Under-Illumination

Some manufacturers under-illuminate as much as 1/3 of the reflector diameter to block out normal terrestrial interference from spilling over the edges of the reflector.

When the antenna f/D ratio is deeper than the feedhorn is designed to accommodate, or the feedhorn is positioned short of its ideal focal length, under-illumination occurs.



Proper-Illumination

Illumination refers to the way the reflector is "seen" by the feedhorn. Proper illumination occurs when the f/D ratios of both the feed and the antenna match exactly and the focal distance of the feedhorn opening is set precisely where the microwave signals reconvene. The exact center of the feedhorn opening cannot vary more than 3/8 of an inch from its ideal, centered measurement without a loss of signal. Remember, that is 3/8 of an inch from any point on the reflector surface.

How Deep Should A Dish Be?

To the untrained observer, one satellite dish resembles a saucer while another looks more like a teacup. Which depth is best? The answer is simple: neither.

In order to understand why the depth of curve on satellite dishes varies, you must first know the two relevant measures for antenna performance. The first is diameter (a capital D), the distance from one edge of the dish to the other with the tape stretched tight (not following the curve) and crossing over the exact center. The second is focal length (lowercase f), the distance of the feedhorn from the dish. The first measure, D, will always be greater than the second, f. Dish depth can be measured by its f/D ratio, a number derived by dividing f by D. The number will always be less than one.

According to Bob Cooper, Jr., physicists agree that there is an ideal f/D ratio that will produce the clearest pattern and one that will provide the most gain (amplification of signal). Unfortunately, the two ideal ratios are not the same.

An f/D ratio in the region of .3 produces the cleanest pattern and the best rejection of terrestrial interference. An f/D ratio in the region of .6 provides the maximum gain; however, no dishes of this depth are currently being manufactured. Antenna manufacturers today cluster their products around two f/D ratios: .3 and .45. The first coincides with the region giving the best picture. The second is a compromise between the region of best picture and the region of highest gain.

As a consumer, you should know that either depth can give you a good picture, provided that the system is working together properly. *You must, however, be sure that the feed is compatible with the f/D ratio of the dish.* Most feeds are clearly labeled by the manufacturer; however many labels fall off. Be careful to verify that the feed you place on your antenna is made specifically for the f/D ratio of your antenna. Here is what will result if they don't match:

Over-illumination. In this case, the feedhorn is too far from the antenna and a poor picture with "sparklies" results from noise picked up from outside the edge of the antenna. The feed is literally over-reading the signal and picking up interference from the ground and elsewhere.

Under-illumination. In this case, the feedhorn is too close to the antenna and the result is a weak picture. The feed is under-reading the signal, causing an eight-foot dish to deliver the quality of picture of a six-foot dish.

It pays to make sure you've got a good match between your antenna and your feed. Also, once the right feed is found, it must be properly mounted on the antenna, since the feedhorn opening cannot vary more than 3/8" from its ideal distance from the antenna without some loss of signal.

When the system is compatible and well-installed, there is no one best antenna shape. When a system is incompatible or poorly-installed, there isn't any antenna shape that will work. ♣

"CABLING" Your Home Entertainment Center

How To Hook Up Components For The Ultimate In Sight And Sound

BY TIM HARRINGTON

There is a definite trend in home entertainment systems toward individual components. This follows the same trend that audio did years ago which began with complete console systems that included a turntable, radio and TV all permanently built into one box. Today most equipment, such as a turntable or tape deck is bought individually and connected to a system that already exists in a home.

There are a number of good reasons for this evolution:

- 1) Primarily it provides the ability to interconnect components into an entire customized system optimized to the taste and requirements of the individual.
- 2) Makes it very easy for you to upgrade a system with better equipment on a component by component basis.
- 3) Additional processing and enhancing components such as graphic equalizers and video processors can be easily added to the system.
- 4) When a component fails, only that piece need be taken in for repair leaving the rest of the system operating.

As people acquire more and more video and audio components such as stereo systems, VCRs (Video Cassette Recorder), satellite TV systems, and video and audio laser disc players, they will be more inclined to connect them together in such a way that any program source can be enjoyed from any TV set in the house. Furthermore, recording and playback devices can easily share programming. Instead of operating as separate units, they will become part of a complete home entertainment center. As additional equipment is purchased, such as a video cassette recorder, it is simply wired into the system. This is a case where the sum of the parts is greater than the whole.

There are two fundamentally different approaches to the interconnection and distribution of different programming sources in a home entertainment system. The first utilizes a switching system to select different programming sources to be sent to different TVs for display and the second utilizes the cable company method of having all of the video sources present on one cable all of the time.

There are, as you might expect, pros and cons to each one of these methods and each method will be examined in this two-part series of articles on cable distribution in the home. The first article will cover the switching and dividing method of program distribution and the second will cover the modulation technique.

Let's begin by taking a look at the basic concepts of putting together a home entertainment system.

PROGRAMMING SOURCES

The first step is to decide which programming sources (inputs) you want for your system such as a TV antenna, satellite dish or VCR and where you would like to place

them. They should ideally be grouped together in one room to facilitate the inter-connection of each one; however, more complex cabling configurations will allow for placement in separate rooms.

PROCESSING (Optional)

There are a number of video and audio processing devices available today that can enhance and improve both the video and audio quality of your system. These devices range from video processors that correct color imbalances and improve apparent contrast detail to graphic equalizers that allow you to custom shape the frequency response of the sound to suit your taste and the unique acoustic characteristics of your room. These types of components can be added later as desired by simply placing them in the system between the programming source and the recording or display component.

DISTRIBUTION

All of these components must then be connected together into a system that is capable of switching the program sources between different TVs, monitors and pieces of equipment for recording.

DISPLAY AND RECORDING

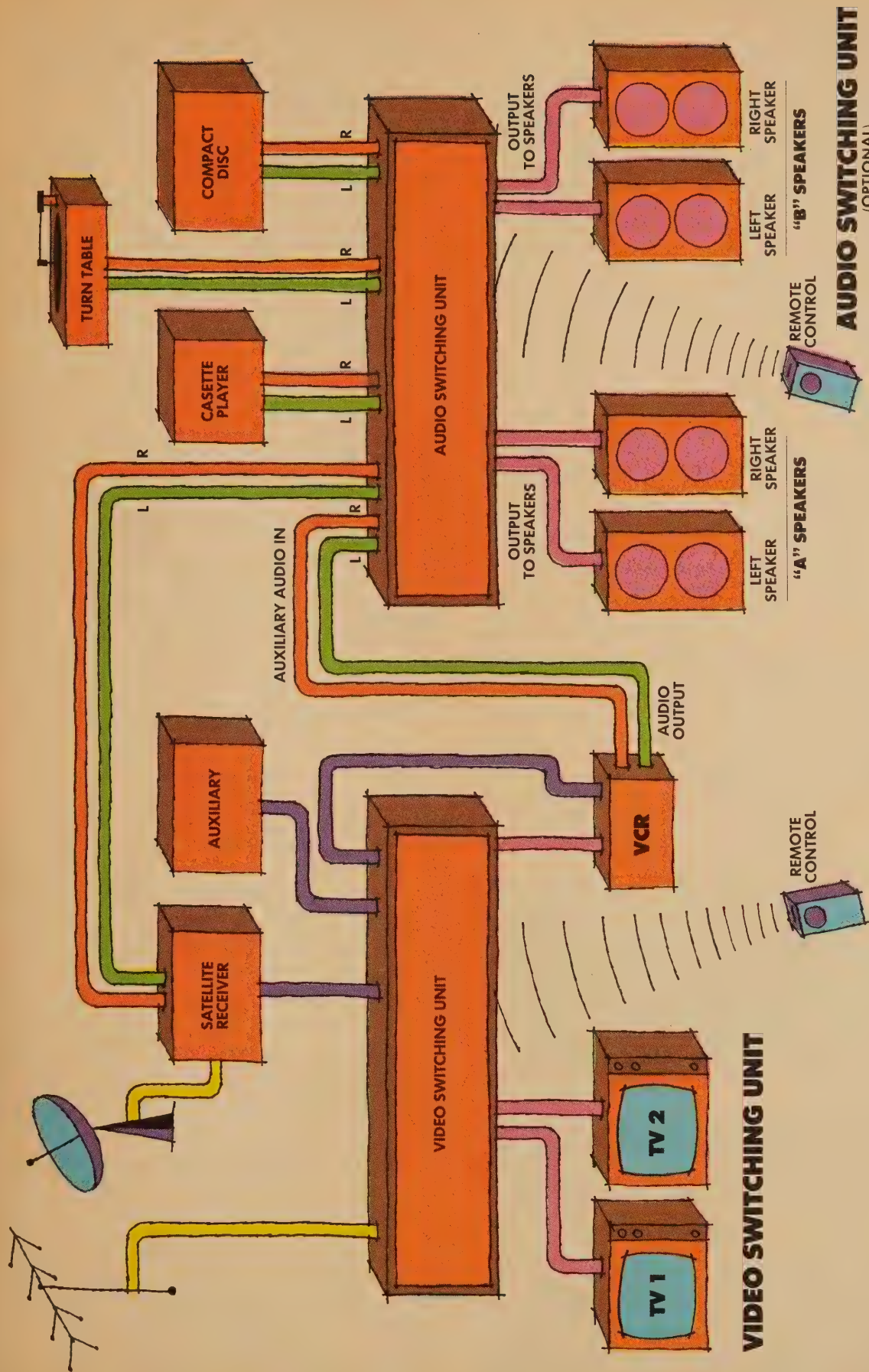
Finally you must decide which types of equipment that you want to receive the various program sources. You may have more than one VCR and wish to configure the system so that either VCR can record from any programming source including the other VCR.

GETTING STARTED ON YOUR SYSTEM

Connecting a VCR to a TV set or monitor is the first step that gets most people started on setting up a home entertainment system. Although this is an easy task, many people end up with poor picture quality simply by using the wrong cable type, the wrong connectors or using the wrong tools to attach the connectors. Please read the section in this article on working with cable and connectors if you have not had experience with coaxial cable or are not sure what type of cable to use. Doing the job right is not difficult and can have a significant impact on the final quality of your picture.

If you have additional programming sources that you want to include in your system, such as a satellite TV system, laser disc player or more than one VCR, you will need to set up a method of switching and dividing the signal so that you can select which signal goes to which TV

Continued on page 62



AUDIO SWITCHING UNIT (OPTIONAL)

SUCH AS THE SONY STR-AV 460

VIDEO SWITCHING UNIT

"Cabling"

set in your system. Although you could connect a group of A/B switches in such a way that switching could be accomplished, they would be inconvenient to operate and would degrade or reduce the quality of your picture. The reason for this is that every switch, connector and foot of cable you add to your system takes a toll in signal strength. A good quality video switching unit will minimize this loss and maximize your picture quality. You may find that your system requires a line amplifier which will boost the signal to compensate for signal loss due to the factors mentioned above. This will be covered a little later.

A basic video switching device typically includes four inputs:

- Regular TV antenna
- Satellite TV or cable,
- VCR
- Auxiliary (extra input)

and three outputs:

- Two TVs
- VCR

Any programming source can be sent to any output with the simple push of a button or turn of a knob.

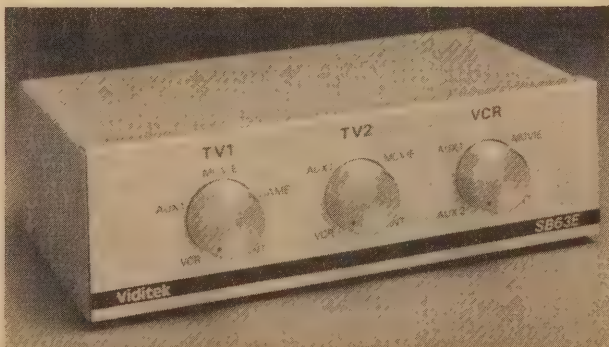
ADD STEREO SOUND TO YOUR VIEWING PLEASURE

The quality of sound produced by satellite TV, stereo HiFi VCRs and laser disks is phenomenal and you may want to integrate your stereo system into your home entertainment system. If so, you may want to consider spending a little more to purchase one of the newer integrated home entertainment control systems which include a stereo receiver and remote control capability of most or all of the connected components. If this concept interests you, make sure before purchasing one that it will do what you want it to do and that it is compatible with the brands of equipment you already own. Some of these units can also by remote control operate all of the equipment connected to them including an audio cassette recorder, compact disc

Remote Switcher - Infrared controlled for ease of use.



Manual Switcher - Allows for 3 outputs (courtesy VideoLink)



and turntable. If this concept intrigues you as it does me (I already own one), set aside some time for shopping and comparing features between different units. They do so much that it may take you awhile (as it did me) to really comprehend all of the features available and to decide which ones you want.

WORKING WITH CABLE AND CONNECTORS, DO IT RIGHT!

When building your home entertainment center, remember that audio and video systems operate as a complete system. Just as with a satellite TV system, the total performance of the system will only be as good as the weakest link in the chain of components that work together to bring you good quality audio and video.

Many of the problems that I find with home entertainment systems that I have seen are not some complicated problem with the equipment but a simple problem with poor cable or a bad connector. I recommend that you purchase good quality RG-59 cable from a reputable electronics supply store and purchase a tool that properly crimps the RF connectors onto the cable. Ask a salesperson to help you select the proper tool and show you how to strip the end of the cable and apply the RF fitting. Do not use a pair of pliers to crimp the connectors as this will increase the chance of a poor quality connection at the fitting.

When securing cable running through your house, do not use staples, nails or anything else to secure it that might damage the outside insulation. If you need to tack cable down there are special clips that you can buy that will hold cable in place without damaging the outside insulation. Even crimping the outside insulation can change the properties of the cable in such a way as to degrade the picture quality received at the other end. Another critical point is to be careful not to bend cable too sharply at a 90 degree angle when turning corners but rather put a gradual bend in it.

LINE AMPLIFIERS

As I said, each connector, switch and foot of cable takes its toll in signal strength and if the signal strength falls below a certain level, your picture quality will suffer. In this case you will need a line amplifier to boost the signal back up again, which is just what the cable companies do to get the signal over the miles from their satellite dish to homes all over the community. Line amplifiers are rated in dBs of gain and come in assorted ratings that usually range from 10 dB to 31 dB. If you need a line amplifier, it is best to go to an electronics or TV store and find a knowledgeable salesperson to help you select the right line amp for you based upon the size of your system, the length of the cable run and the number of components involved. If you have UHF signals (channels 14 through 83) coming into your home, make sure that you get a line amp that covers both the UHF and the VHF frequency range.

POINTERS AND HINTS FOR SETTING UP YOUR SYSTEM

When connecting a cable to a TV make sure that you use a splitter that also allows you to connect to the UHF input of the TV. If there is no UHF input then the splitter is already built into your TV. If there are both screw terminal inputs marked VHF and a cable input then there is most likely a switch marked "75 ohm/300 ohm." If you are using cable then set the switch to the 75 ohm position. The 300 ohm terminals are for flat lead wire which I do not recommend in that overall it is inferior to coaxial cable.

When connecting a cable to a piece of equipment, take

care not to bend the center conductor (wire) while carefully inserting it into the hole of the female connector. Also make sure that the cable is firmly screwed onto the connector so that good contact is made.

TROUBLE SHOOTING YOUR SYSTEM

Trouble shooting a system is really just a simple matter of the process of elimination. If, for example, you have a VCR that produces a poor quality picture, the first step is to bypass any switchers, dividers or amplifiers and connect the VCR to a monitor or a TV with a short piece of cable. If this temporary arrangement produces a good picture then you will know that the VCR is functioning properly and the problem is somewhere in the cable system between the VCR and the TV. The next step is to continue to temporarily connect the TV at points further on down the system until the system produces a poor quality picture. At this point you will have found the component responsible for the problem and can then remove it and either replace it or have it repaired.

When you have a problem, don't overlook individual connectors as the possible culprit. It only takes a small piece of wire in a connector to short it out and substantially degrade the quality of your picture. If you suspect a piece of cable is causing a problem, disconnect it and examine the inside of the connector to ensure that there is not a piece of the outer braid wire wrapped around the inner conductor causing a short. Another common problem is a loss of the strength of the signal by the time it gets to a TV. This is a function of the length of the cable you are using and the number of connectors that the signal must pass through. Use a line amplifier if necessary.

A WORD ABOUT MONITORS

A monitor looks, for all practical purposes, like a regular TV set so what's the difference, why do they cost more than conventional TVs and why do some people prefer them? The reason is that monitors skip a stage in the process of transferring the signal from the source to the screen which eliminates noise interference and therefore improves picture quality. A true monitor can only operate with separate composite video and audio inputs such as those found on the back of the satellite receiver, VCR or a computer.

The advent of the combination monitor/TV further confuses the issue for some people. This is just a monitor with a built-in modulator so that it can receive a modulated program source such as the signal from a TV antenna and convert it to the direct signal used by monitors. This type of monitor will have two types of inputs, one for composite video and audio and also an RF (radio frequency) for a cable input. If you are interested in purchasing a monitor, you compare the picture quality to a regular TV to see if it really makes a difference to you when connected to a VCR with a good quality tape. If not, then using a monitor/TV as just a TV set is a real waste of its full potential and your hard earned money. In order to enjoy the advantage of a monitor, it must be connected to a programming source via cables with RCA plugs to a source with composite video and audio outputs.

Combining your video and audio components into an integrated system will add greatly to your overall enjoyment of audio and video programming. The beauty of a home entertainment system is that you can continue to expand it as you purchase new equipment and wish to spread your system into more rooms of your home.

GLOSSARY OF COMPONENTS


A/B switch—A simple switching device with two inputs and one output which allows the selection of either one of the inputs to be sent to the output.

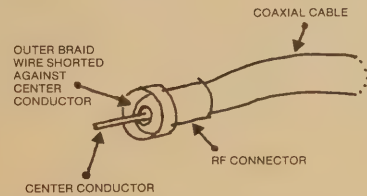
Composite video—A complete video signal that has not been converted through modulation to a frequency or channel that can be received by a standard TV set.

Divider or splitter—A simple connector with one input and two outputs which takes the input and sends it to both outputs.

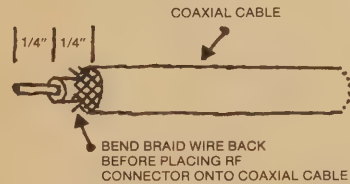
Line amplifier—For cable TV use, a device which takes a TV signal input and amplifies it by the rated amount and sends it to an output.

Special thanks to Video Link for their contribution to this article. For further information on their products they can be contacted at 12950 Bradley Avenue, Sylmar, CA 91342.

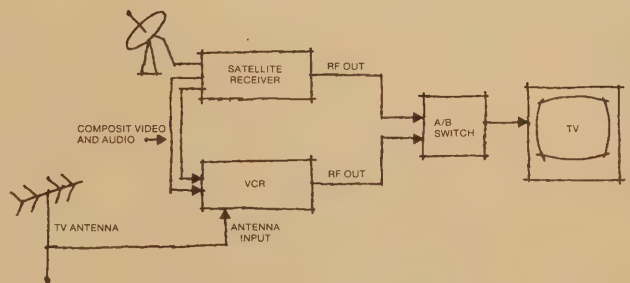
This article is an excerpt from a book on home entertainment systems by Tim Harrington to be published in the future. 



INSPECT INSIDE OF CONNECTOR FOR WIRE DEBRIS THAT MIGHT CAUSE A SHORT CIRCUIT.



COAXIAL CABLE PROPERLY STRIPPED IN PREPARATION FOR RF CONNECTOR.



THIS ARRANGEMENT ALLOWS A HIGH QUALITY DIRECT RECORDING SIGNAL FROM THE SATELLITE SYSTEM AND USES THE VCR/TV SWITCH ON VCR TO SWITCH BETWEEN VCR AND REGULAR TV ANTENNA.

NOTE: COMPOSIT VIDEO AND AUDIO INPUTS MUST BE DISCONNECTED TO RECORD OFF OF REGULAR TV ANTENNA.

SIMPLE HOOK UP ARRANGEMENT FOR SATELLITE TV, VCR AND REGULAR TV ANTENNA.



EXCITING NEW SHAPES

They Really Don't Have To Be "Dishes"

BY TIM OLIN

Imagine that you may have noticed that not every home satellite dish is round. Some are diamond shaped, some oblong, some rectangular and some, seemingly are square. What difference does the shape make in how an antenna operates?

Keep in mind that basically an antenna or dish is a reflector, but that notion may be changing as we will see.

Let's slip into the past history of home satellite television for a clue to the answer to that question of shape. One of the original manufacturers in the dish business was a company called National Microtech. They had some of the very finest fiberglass antennas on the home market. It was unique in the fact that it was diamond shaped. One of the owners told the story behind the shape.

He was concerned about the great sums of money that it took to ship their original, ten foot round fiberglass antennas. The antenna's were overwidth to haul and had to be stacked or fitted into frames that stood them up. So one day he decided to take a saw to one of the dishes and proceeded to cut it into a diamond shape, mainly for convenience of shipping. He found that the antenna still worked and that it could be



Umbrella Dish - It folds up (by Toki).

shipped easier and for less money. It is a true story.

However, there are many other odd shaped antennas on today's market that are not made the way they are for shipping purposes alone. Some are made the way they are for marketing reasons. They want that little something different that catches the eye and sets that particular antenna off from the general run-of-the-mill, round antenna. They may claim that, because of the shape, they have an advantage over the others, but I would hesitate to believe that totally.

There are several rectangular shaped antennas on the market, Pico's "The Kid," and SAMCO's "Elf" are two that come to mind. Both use an offset feed. The feed is mounted at the bottom of the dish, the idea being that it eliminates anything from out in front of the dish. The way that these two dishes

look at the satellite is different than the way a round dish sees it.

A rectangular dish has a narrow beamwidth. In other words, it sees a dish as illustrated in figure 1. The advantage of this is that it separates satellites better than a round reflector, making it more desirable when 2 degree spacing comes into play. Of course, a round antenna that is big enough, nine feet or larger, and is built properly will separate the satellites just as well. So what is the advantage? All things considered, it still lies in the size and shape.

Some applications call for a small antenna. Many small antennas have trouble separating adjacent satellites. Thus, a dish like "The Kid" is the solution for small dish applications for 2 degree spacing. Although zoning against dishes is becoming less and less a problem, all the ways to combat zoning we can come up with the better. With the "high tech" look rectangular antennas have, it makes it more attractive and esthetically pleasing to everyone's eye, thus countering the argument against those "big, ugly, round things sitting in one's yard."

There are some other rather exotic designs that may be entering the market before the year is out. I say, may be, because these are proposed designs and all the manufacturing and marketing bugs will have to be worked out before we see them in great numbers.

The first one is the Diascon 2000 Antenna. According to the information I have, the Diascon uses something called a suspended strip line feed network. It is a moulded panel structure, with a diamond shape only 60 inches square and 2 inches deep. The system is completely mounted and ad-

Flat Dish - Yes, it does pick up the signal. In fact, it does a better job of it than some curved dishes! Called a "Focus Frequency Selective Antenna," each ring captures a portion of the signal focusing it toward the center feedhorn - manufactured by Focus Technology, 33 Music Square W., Nashville, TN 37212.

New Shapes

justed in-factory. It has no feedhorn. Its introduction is slated for this summer and is an import, surprisingly from Scotland and not from the Land of the Rising Sun.

The second is similar to a flat plate solar collector. It is called the PhaseCom antenna and is roughly five foot square and two inches thick. It uses a process of changing charged particles back and forth. The advantage of this type of antenna is the low profile. I visited with the people marketing these antennas and they look for delivery of these antennas in the middle of the summer. I asked them about what hail would do to them and was told that the covering would be an almost indestructible plastic.

Some other features the PhaseCom would have is Ku-band capability as well as C-band, no actuator, but the ability to see the entire satellite belt, easy to replace circuit boards, and no traditional LNA or feed. It will come with its own controller that does not physically move the dish but changes some circuits with the antenna itself to go from one satellite to another. The idea behind it is not a new technology as it has been used by NASA and by the military. It is something we will be hearing more about in the future.

about two inches thick. I saw one at the recent satellite show in Las Vegas. the recent satellite show in Las Vegas. It was made of very heavy metal and had rings etched in it in a concentric form, with the outside rings being the deepest and the middle area being raised the least. It was a prototype and the people there with the dish were not sure as to the materials that they would use to build the actual dish that would go on the market. They were using it as a Ku-band antenna.

We will probably see more and more dishes of the oblong and rectangular nature because of the growth of Ku-band. Ku-band uses a more powerful signal than C-band does and therefore a smaller dish can be used. There are already many of these odd-shaped dishes in use now in the delivery of data from satellites.

As we have seen, there is more than one way to catch or reflect a satellite signal. This is a rapidly changing technology with room for many different ideas. Just when some of us thought that there wouldn't be any revolutionary changes for awhile, innovative individuals continue to make sure we don't remain in the same old circle. ▀



Flat as a Plate - This antenna from Phasecom is thin with no curvature. In addition, it does not need to face the satellite in order to receive the signal! It only weighs about 20 pounds and uses complex electronics to receive - from Future Communications, Colorado Springs, Colorado.



Dishes of the Future - Smaller, more compact and often with greater sensitivity, they allow for mobility as well as a clear picture. They still can't produce the signal strength of a 12-foot conventional, or even some good 9 footers, but improvements make this an area to watch closely.

THE TWO DISH SYSTEM

Another Approach To Ku Band

BY PETER C. SUTRO

Much has been written in recent months about the arrival of Ku-Band satellite television, otherwise defined as signals broadcast from satellites in the 11.7 to 12. GHz frequency range. This technology is not to be confused with the technology known as high-powered DBS and which was widely touted as the answer to all our dreams enabling us to receive satellite television on one foot diameter dishes by the late 1980's. With the failure of USCI and the withdrawal of Comsat and Rupert Murdoch who had announced their intention to use that technology, it would appear that plans for high-powered DBS have been put on the back burner for the foreseeable future.

So it would appear that we are stuck with Ku-Band or medium-powered DBS using transponders in the 45 watt range which should provide excellent reception in the continental United States on 4 to 6 foot diameter dishes. Now comes the question of how to make the nearly 2 million existing TVRO's compatible to C and Ku-Band transmissions. The obvious answer has been explored in many articles over the last year and consists in attaching a Ku-Band feed and low noise downconverter (LNB) by some mechanical device to the existing C-Band feed and LNB and providing some device for the polarization on the Ku-Band feed.

This kind of retrofit equipment is being offered by a number of firms—primarily Chaparral with its 12 GHz Polarotor—as well as by Seavey, Northsat and Stolle with other manufacturers waiting in the wings. All of these retrofit products offered to date place the C and Ku-Band feeds next to one another—attempts to concentricize the two feeds have so far proven unsatisfactory. Since this system necessarily places one of the feeds off-center from the prime focus of the antenna, a penalty has to be paid in terms of some signal loss to one of the two feeds depending on which one, C or Ku-Band you choose to place at the prime focus position.

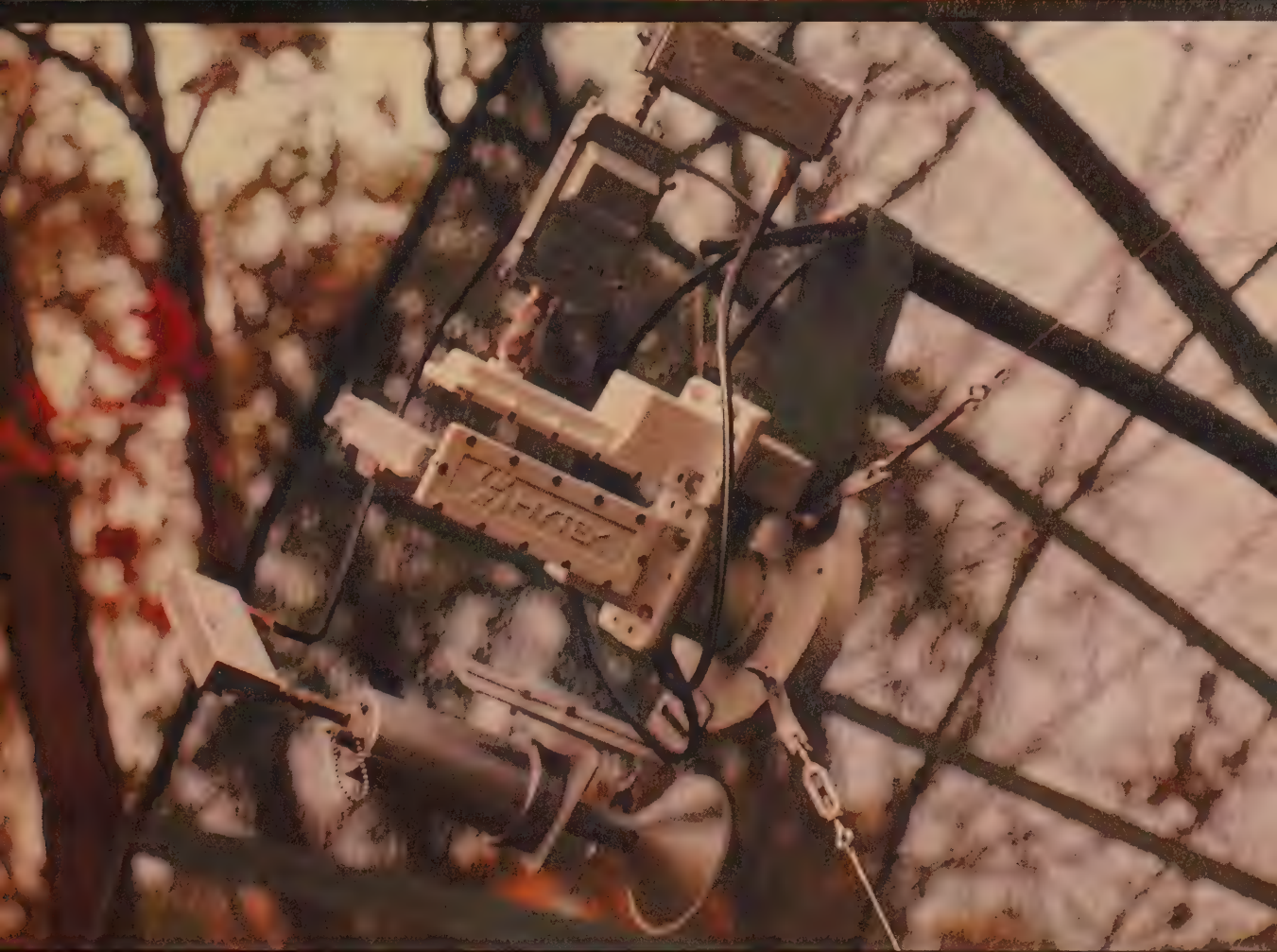
This decision will probably depend on how much margin or overkill you have already in your C-Band system and how much signal you are willing to give away by off-centering the C-Band feed (remember that with the passage of time the satellites get weaker). Conversely, if you have an accurate solid dish in the 10 foot diameter area you will have so much overkill at 12 GHz that you can afford to lose some

signal by off-centering the Ku-Band feed. The question of how you should retrofit arises in the case of 10 foot or smaller diameter mesh or perforated dishes. These may be working satisfactorily at C-Band but have very little margin and may prove to be unsatisfactory with an off-center Ku-Band feed. You may also have a dish which does not lend itself to dual band feeds such as my 10 foot Harris Delta Gain dish with its Cassegrain-like design which does not allow for an off-center feed.

Then the technical and practical solution may be not to scrap the old system and start over again, but, rather to install a second small dish to accommodate Ku-Band reception only. This will not be as expensive as it sounds providing that your existing C-Band receiver is compatible to Ku-Band as most block downconversion receivers which are in the 900-1400 and 950-1450 MHz range and manufactured within the last couple of years are. The reason for this is that there are no LNBs nor block downconverters available on the market which will take the 12 GHz frequency down to a first IF of 430 to 930 MHz or directly to 70 MHz. However, solutions to these problems are currently being studied, especially for the 430 to 930 frequency favored by Janiel, SAT-TEC, Locom, Anderson and others. But if your receiver is not compatible, you will have to buy a new one anyway whether you install a second dish or retrofit your existing one. In either scenario you will have to buy a 12 GHz retrofit kit including an LNB and polarization device. Additionally, you may have to buy a new C-Band

Continued on page 70

Is More Better? - When adding Ku band to an existing system, the answer may be, "yes!" While retrofitting systems are available, often it is simpler (and cheaper) to simply buy a new Ku band dish and set it up next to your existing C band. The two approaches are shown in the author's back yard where a Harris 10 foot and a Stolle 6 foot stand next to each other. Nearby is a retrofitted Ku band LNA on a C Band dish.





Shotgun - Ku/C band Feedhorn from Chaparral



Accuracy required - When adding a Ku band dish a good drive and mount are vital.



Retrofitting - The Ku feedhorn inevitably ends up slightly off center. The result can be disaster for some dishes do not allow for offcenter feeds.

Two Dish

LNB/LNA and polarization device in order to retrofit you existing dish which you would not have to do if you install a new dish.

Therefore, the additional investment in the two dish system is the cost of the dish itself together with the mount and motor drive to steer the dish. Take into consideration that the accuracy of the motor drive to position the Ku-Band dish needs to be finer than that needed for C-Band positioning so that your old motor drive may also need changing. In the case of the installation pictured in this article, we found that the motor drive and polarization controls built into the DX 800 receiver were adequate to drive and control both C-Band and Ku-Band dishes and their respective polarization devices. If the length of the power wire runs to the electric motors is very long, you may have to increase the gauge of the wire to take more amperage to the motors.

Using this system, the Ku-Band dish becomes the slave of the C-Band dish (do not connect the sensor wires to the Ku-Band motor) and the location of the Ku-Band satellites on your programmer will bear little relationship to their actual locations in the satellite arc. That is because the gearing of the two mounts will almost certainly be different and

the two dishes will move at a different rate. That is to say, if the C-Band dish is pointed to Galaxy I at 134° West Longitude (as it is in the picture) the Ku-Band dish will be pointed at about 120° West Longitude or the location of Spacenet I (the westernmost Ku-Band satellite). When the C-Band dish traverses its total arc and is pointed to Satcom F2 at 72° West Longitude the Ku-Band dish will be pointed at about 81° West Longitude or the RCA American K2 satellite (the easternmost Ku-Band satellite). Thus, while the C-Band dish traverses an arc of 62°, the Ku-Band dish only traverses an arc of 39°.

One disadvantage of the two dish approach is that your neighbors who may just have gotten used to the sight of your C-Band dish may be pushed over the edge of tolerance by the appearance of its baby brother. On the other hand, an advantage may lie in the portability of the little dish. You may want to take it with you to a vacation home. You could even convert the little dish to C and Ku-Band reception as long as you were willing to put up with less than perfect pictures on vacation. In short, the two dish approach gives you more flexibility and better reception of both C and Ku-Band frequencies at a not prohibitive price increment. ▀

Ku in the Spotlight

A New Band On Stage In Nashville

BY JIM GRAY

Two more bands were on center stage in Nashville recently, and they caught some favorable attention from nearly 3,000 people.

The 3,000 were attendees at the Satellite Opportunities Expo for Home and Business, which opened its doors April 6th to satellite industry professionals who viewed and learned about the latest in C and Ku-band technology. The Expo, which ran through April 8th, was held at the Opryland Hotel and Convention Center.

In opening the show, Dr. Ed Meek, president of Opportunities Publishing, Oxford, Miss., which co-sponsored the show with the University of Mississippi's Center for Telecommunications, noted that the Expo took a different approach by offering two distinct conference tracks.

"One of the tracks available is the TVRO home entertainment track," Meek told the opening day audience, "which will have a heavy dose of Ku-band emphasis as well as C-band marketing, technology and innovations. In addition, there is the satellite business conference, which runs concurrently."

Participants could choose either track at registration and attend several related seminars during the run of the Expo, as well as tour the exhibit hall where some 65 satellite TV manufacturers and distributors had booths and displays.

The Business Conference track, which focused on the increasing opportunities in the high-tech application of satellite television, featured such topics as Private Satellite Networks, VSAT Applications for Business Data, Encryption System and several others. The Home Entertainment track addressed some of the basic concerns of the mainstream TVRO home satellite dealer: Marketing in a New Era, Increasing Sales and Profits, Ku Receiving Technology, Ku/C-band Antenna Design and more.

Dr. Ron Marshall, director of the University of Mississippi Center for Telecommunications, spoke briefly to first day participants on the issues that confront the industry.

"The satellite industry today is faced with a great many critical issues," Marshall said. "Even a short list of these issues must include such things as the rapid proliferation of fiber optics, transmission security, excess transponder space, and the very uncertain regulatory structure. The industry experts who will be addressing us are eminently qualified to discuss these and other industry issues."

Marshall then introduced Dr. Yoshihiro

Konishi, holder of numerous awards and honors for his work in satellite communications and currently senior executive vice-president of Uniden Corp., Japan. Dr. Konishi discussed recent trends in satellite technology not only in Japan, but world wide. He cited the tremendous amount of ongoing research and development and discussed the new products and programs Uniden will present to the U.S. marketplace. He also listed the new satellites scheduled to be launched through 1990 in Europe, Australia, Japan and the U.S.

A highlight of the show was the Keynote address delivered by Larry Speakes, White House Press Secretary and Assistant to the President. Speakes was introduced to the audience by the Chancellor of the University of Mississippi, R. Gerald Turner.

In remarks entitled "A World Growing Smaller," Speakes pointed to the fact that communications in general, and satellite communications in particular, would have a growing impact on the United States' relationships with other countries. He also discussed the implications of communications in the future of the U.S. in terms of national defense, economic growth, education and the quality of life in American society.

Participants at the show attended a wide variety of seminars conducted by high level industry leaders. The list of speakers in the Business Conference track included Dr. C.J. Waylan, president of GTE Spacenet; Edward O. Fritts, president of the National

Association of Broadcasters; Jim Bunke, senior vice-president, Corporate Marketing, M/A-Com; Charles Zito, vice-president, Network Products Division, Comsat; Fred Del Toro, senior vice-president, HInet Communications; Steve Salamoff, assistant vice-president, Domestic Sales, M/A-Com Satellite Communications; Dr. Elizabeth Young, vice-president for development, Comsat Video Enterprises; and Andrea Schnurr, director of marketing, National Satellite Paging, Inc.

Among the speakers for the Home Entertainment track were Chuck Hewitt, executive director of SPACE, who spoke on "The State of the Industry;" Hiro Sugiyama, president of DX Communications; Hans Giner, president of Luxor North America; Bill Stark, marketing director for Uniden; Dr. Peter Foldes, consultant to Stolle Corp., and a number of other recognized industry professionals.

Dr. Meek, who is publisher of *Satellite TV Opportunities* and *Ku-band World* magazines, expressed his conviction that the Satellite Opportunities Expo addressed the particular needs of a shaken satellite television industry.

"This is the first of a series of shows with Ku emphasis that Opportunities Publishing and the University of Mississippi will present," he said. "We will probably expand it to include a series of seminars that will be targeted to some of the commercial people."

"I think the show has been a tremendous success. The crowd for Dr. Konishi, who some people call the father of DBS (Direct Broadcast Satellite), was literally standing-room only. We had a good division of people who were interested in satellite business communications as well as home TVRO. That confirms what we feel is the merging together of two different marketplaces, which will come to pass with the development and marketing of Ku technology." ■

Little Dishes - One of the trademarks of the 12GHz systems is the smaller dish. All sizes were on display at the major conference in Tennessee.





Hooking Up The VIDEOCIPHER II

This article is devoted to installation and operation of the M/A-Com Videocipher II descrambler to receive HBO and Cinemax.

TWO VIDEOCABLE II MODELS

There are two models of M/A-Com's Videocipher II descrambler available to satellite system owners. The Series 2000 E/B is designed to operate with a number of receivers such as the M/A-Com T-1 and H-1 which feature a baseband (ie. composite) video output.

The Series 2000E works with single-conversion 70 MHz input receivers such as Drake's ESR 240, and with any receiver featuring a 70 MHz loop such as the block-conversion Chaparral Sierra.

Since most receivers are compatible with the Series 2000E, this article concentrates on installing this model. Both models operate identically.

HOW VIDEOCIPHER II WORKS

To descramble HBO and Cinemax, you Videocipher II must first be authorized for reception of these channels. The scrambled TV signals are broadcast to the satellite along with the digital control data which includes the unique authorization code or "address" for each descrambler. As long as your Videocipher II remains authorized (by paying the monthly bill), the video and audio will be unscrambled when you tune to HBO or Cinemax.

HOW TO BUY A VIDEOCIPHER II

The Videocipher II is available from a variety of sources, at a price of \$395.00. To purchase the descrambler, you should first check with your satellite dealer who probably stocks this item. A local cable TV company may also supply the Videocipher II to satellite system owners.

If not available locally, you may purchase your descrambler by mail-order through a variety of companies. In addition, Channel Master also sells

the Videocipher II under its own label.

Whether you purchase the descrambler locally or by phone, you will find the installation and operation to be quite straightforward.

INSTALLATION (70 MHz Input)

Featured Receiver: Drake ESR 240

To install the Videocipher 2000E with the Drake ESR 240 or other 70 MHz input receivers, simply connect the 70 MHz output from the LNA/downconverter to the 70 MHz input on the descrambler. The descrambler 70 MHz output is then connected to the receiver input.

VHF, video and audio cables are also run between the receiver and Videocipher II. In all, 10 connections can be made depending on whether you are using a TV set or a video monitor and amplifier. See the Figure 1.

INSTALLATION (70 MHz Loop)

Featured Receiver: Chaparral Sierra

My home system uses the Chaparral Sierra receiver which features a 70 MHz loop. In this case the LNB connects directly to the receiver input as is normal. The receiver 70 MHz output loops through the 2000E input and output and returns to the receiver through the 70 MHz loop input.

The same VHF and video connections are made as with the Drake receiver, but because the Sierra features stereo, audio, both left and right channel audio connections are made. The photo and diagram below show the backs of both units with all connections for TV set and monitor viewing.

Fortunately, M/A-Com provides an easy-to-follow owner's manual for the Videocipher II which covers these hookups in much greater detail than the scope of these illustrations allows.

Chaparral also provides a technical bulletin which describes the exact procedure for hooking up the Sierra system with the descrambler. With the help of these manuals, I found the

Videocipher II to be no more difficult to install than a typical VCR.

GETTING AUTHORIZED

After installing the descrambler, I aimed the dish at Galaxy 1 and tuned the receiver to transponder 23 which is HBO's eastern time zone feed.

Following the Videocipher II instructions, I pressed the SET UP and #1 buttons on the front panel to bring up two numerical displays on the TV screen. One display is a signal quality line. Fortunately, I was using the Paracclipse 12' and Chaparral's 65" PolarAmp LNB so I had no problems with signal quality from Galaxy 1.

The second display is the Unit Authorization Number. This is the unique number that identifies your descrambler from all the others. It was this number that I reported to HBO, Inc. a few minutes later when I called to request authorization of my unit.

The operator was quite pleasant and asked for a variety of information including my home address, phone number and the unit authorization number. I decided to charge the \$19.95 monthly fee for the HBO/Cinemax package to my bank card, so that number was also recorded. I was told to keep the receiver tuned to the HBO channel and to wait approximately five minutes for the descrambler to be authorized.

Sure enough, soon I was seeing pictures as HBO went in the clear. After watching this channel for a while, I switched to transponder 19. There was a momentary delay, followed by a display which informed me that I was viewing Cinemax East.

Later, by moving the dish to Satcom F3, I was able to tune to the HBO and Cinemax pacific time zone feeds. The video and monaural audio on all four channels is excellent through the Videocipher II, and by adjusting the audio and video levels into the descrambler, I was able to switch between descrambled and nonscrambled channels without an noticeable difference in picture or sound quality.

ADDITIONAL FEATURES

In addition to simply unscrambling HBO and Cinemax, the Videocipher

425
100m

Photo 1

Personal Messages - Personal messages with information on programs, account billings and credits or special operating instructions can also be sent to you through the Videocipher II.

SCRAMBLER HANDLER

Scrambled or unscrambled, either way satellite TV is the best home entertainment value going. **A**



The Fight On “THE HILL”

The Satellite Case In Congress

There were two sets of hearings in Washington the first part of March dealing with satellites. In the first set, members of the broadcast and cable industries lined up on one side and members of the TVRO industry lined up on an opposing side. Then they threw bricks, statistics, and bottles of ink at one another. In the other hearing, held under more dignified and serene surrounding, NASA told Congress it might not launch any more satellites after all with the Space Shuttle.

The TVRO industry came to the House Office Building on Capitol Hill ready to do battle with the cable system operators and programmers who seemingly are involved in a conspiracy to shut off the flow of satellite programming to private dish owners. Congressman Tim Wirth, a Democrat from Colorado who aspires to become a Senator from Colorado this year, alluded to the battle by opening the hearings with:

“Welcome to the Subcommittee on Telecommunications’ version of Star Wars.”

NASA, meanwhile, was having its own second thoughts about being a launcher of ‘private satellites.’ Feeling intense pressure after the failure of a Shuttle flight at launch, NASA seemed disposed to urge that America develop its own, *private*, non-government sup-

ported launch capability using the older style ‘disposable launch vehicles’ (known as CELVs in the trade). Under such a proposal, only military satellites would be launched by Shuttle flights in the future.

The space communications industry is now approaching a quarter century of service. There are Americans now of voting age who cannot remember a time when we did not have satellites and satellite communications. And the staircase man has built to provide a link with the heavens has developed a few cracks. Nothing is as it was, nor as it will be.

The March 6th TVRO hearings held on behalf of legislation now pending in the U.S. Congress lasted approximately seven hours. The hearings were extremely emotional with cable and programming interests maintaining throughout that they were doing home TVRO owners ‘a favor’ by allowing them limited access to satellite delivered programming. Several Congressmen responded that the public had certain rights of access to any and all programming, regardless of whether they happen to live where cable television service was available or not. And so the battle lines were drawn; cable maintaining that from their perspective they owned the programming and could do with it as they wished, and

TVRO arguing that because the programming arrived at the home through a blend of private and public conveyance systems it must be made available to everyone at essentially the same pricing scheme.

The March 6th hearings resolved nothing. No new public policy would follow after the hearings and the best the TVRO interests could hope for was that the TVRO industry would hang on long enough to prove that they needed the help of Congress before they wend down for the third and final count. A second day of hearings was announced but not firmly scheduled; perhaps in June. Congressman Wirth’s office had far more potential participants for the hearings than he had time. Reportedly, at least 20 Congressmen (and women) requesting the opportunity to appear and testify were excluded from testifying. Another group that was largely missing was the consumers who have bought TVRO systems; only a single representative of the users appeared out of several dozen ‘witnesses’ who did testify. Wirth’s office has promised a larger share of testimony time to users of TVRO if and when the second day of hearings are actually held.

The truth, from my perspective, is that the hearings had to be a bitter disappointment to those people who expected Congress to hear the testimony and then rush back to the floor of the House to adopt a hurried piece of legislation. As impressive and as effective as those testifying on behalf of TVRO may have been, no Congressman bolted from his chair running towards the House chambers shouting “I have seen the light!” Indeed, quite the opposite was evident. Even the skills of the witnesses did not change any significant pre-conceptions already held by various members of the Sub-committee. Congressman Wirth seemed to sum-up the view of a majority of Congress when he offered “Many observers predicted that the skies appeared to be ‘going dark’ for the backyard dish owner. *I do not share this view.* I believe the satellite dish industry will flourish.”

The best seat to the hearings was not at the hearings but rather at home.



Close Scrutiny - Congressmen Tauzin, Wirth and Tauke holding court.

C-SPAN, the 'Cable Satellite Public Affairs Network' carried the opening two hours live and then returned in the wee hours of March 6 and 7 to replay from tape the full seven hour period. There were some memorable moments and not all of those came within the actual hearing coverage. An example.

Late on the evening of the 6th, C-SPAN compromised their editorial integrity just a tad by placing HBO President Michael Fuchs on the air from their studios. The concept was that Fuchs, speaking for HBO, would respond to questions telephoned to C-SPAN by viewers. Ostensibly, many of those viewing were doing so on their home dishes. Perhaps you are not aware how C-SPAN operates.

C-SPAN, an important service, got started when a print media journalist (Brian Lamb) talked several leaders in the cable industry into agreeing to fund a special network to be available exclusively on cable. Lamb plugged a brand new House of Representatives TV camera system into his new control center and went on the air with fulltime coverage of the House. That was more than eight years ago. Remember that the first word in the name of the network is CABLE.

Cable operators fund C-SPAN by agreeing to pay approximately one penny per home per month for the service. For example, with 20,000,000 U.S. homes connected to C-SPAN via cable, there is \$200,000 per month available to operate C-SPAN. They are an efficient outfit but still cannot operate on their nominal subscription

fee of a penny a home per month. So C-SPAN makes up the balance of its budget much like PBS; it sells corporate sponsorships to large and small corporations. In return for kicking in some sizeable change each year, these businesses receive some quantity of on-the-air mentions or credits during the year.

With that background, you should picture HBO President Michael Fuchs being confronted by an irate TVRO owner who is charging that HBO is playing favorites with the cable industry monopoly in programming. Fuchs denies it of course and the host begs off and the programs goes to a corporate identification. There it is on the screen as the announcer thanks big corporate cable operator ATC and its parent. Time (Inc.) for being backers of C-SPAN. Fantastic timing of course; I rolled on the floor laughing, wildly holding my sides since Time (Inc.) also owns HBO. No favoritism here, right!

One of the practical suggestions to come out of the current war between cable and TVRO is that the TVRO industry create its own C-SPAN-like network, headquartered in Washington and offering some sort of unique service as C-SPAN now does. There is of course the question of funding. C-SPAN has a built-in customer base at a penny a home per month. TVRO has no such base. C-SPAN has already tapped the 'free, live coverage' of the House of Representatives; and, will tap the same experimental service of the U.S. Senate this summer. There are no other free programming sources

available in Washington on a daily, routine basis. Maybe the suggestion is not so practical afterall.

It was none the less interesting to see all of the players in the Cable vs. TVRO game lined up before the Subcommittee on Telecommunications and televised nationwide by the cable industry's owned and operated C-SPAN network. For example, there was James Bunker, a Senior Vice President at M/A-Com who tried his best to explain how approximately 3,500 M/A-Com Videocipher units then in the hands of TVRO people represented a significant commitment on the part of his company in the scrambling end of the business. Bunker slid, without grace, from 3,500 to 25,000 to 200,000 as he tried to describe his firm's projected ability to produce descramblers on demand. I hope that others gained the same impression I caught; notable that M/A-Com, as of the hearings, was still struggling to get a handle on the production and distribution of the metal boxes.

Critics and pundits will spend months attempting to analyze the true importance of the first round of hearings. Let me join that chorus with a synopsis of what I saw and detected:

- 1 The hearings were largely a side show in the scrambling battle. The Romans perfected this act some 2,000 years or so ago when they ran lions and tigers into the amphitheater to maul the Christians. I recall that the lions and tigers typically won.
- 2 With a handful of exceptions, most members of Congress want to avoid having to actually vote on this issue. If they vote, they must take sides. If they take sides based upon economic support for their next campaign, they would side with cable largely. If they take sides based upon what is best for rural America, they'd vote with us. The cable operators are the lions in this scenario.
- 3 For the majority of Congress, they will not accept that the TVRO world is hurting unless (a) every magazine in this industry goes out

Continued on page 76

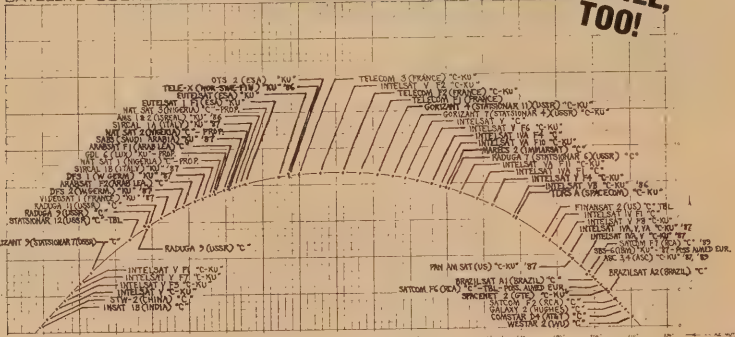
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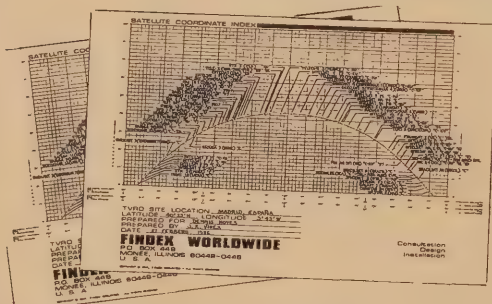
SATELLITE COORDINATE INDEX



TVRO SITE LOCATION: MADRID, ESPAÑA
LATITUDE: 40°25'N LONGITUDE: 3°45'W
PREPARED FOR: DENNIS NOYES
PREPARED BY: J.K. VINES
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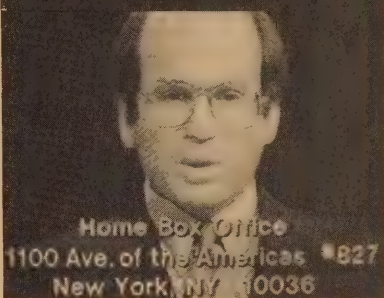
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**Defending - Michael Fuchs of HBO/
Time Inc. on C-SPAN's call-in show during
hearings.**

"The Hill"

of business, (b) every TV program designed for TVRO goes off the air, (c) SPACE closes its doors because it cannot pay its bills, (d) every equipment manufacturer closes his doors, (e) every distributor closes up shop, and, (f) every dealer shuts down. The business failures to date do not register; the losses are so spread geographically that no central clearing house has yet been able to document the depth of the financial problems that has overtaken the TVRO field. Simply put, it is far easier to ignore the isolated reports than it is to collect and analyze the data that is available. The Romans never took a census of the Christians; nobody is counting TVRO people either.

In other words, avoid false hopes. Many of the Congressmen appearing were quite obviously playing to the folks at home, watching on their dish antennas. This whole episode was an excellent example of "the medium being the message." The medium itself was 'on trial' and our elected representatives were doing their best to maintain their Roman dignity while at the same time attempting to act like they identified with the Christians. When it was all over, Caesar Wirth failed to pardon the Christians and off camera, below his desk, I suspect his thumbs were turned down. ▀

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THE HOME SATELLITE STORY

A Newcomer's Guide To The Television Revolution

TV signals from space, direct to the TV set in our home - when we first hear it, sounds like an idea from Buck Rogers.

But, in fact, it's the story of the future happening in the present. With nearly a million home satellite TV receivers installed in the U.S. alone, it's not only real, it's becoming commonplace.

And it's not that hard to understand. We're all familiar with how conventional TV works. There's a local station which broadcasts a signal. The signal travels directly to an antenna placed on our roof, carried down by a wire to our TV set where we view it.

The limitation is that the signal rarely travels more than 50 miles, restricting the number of stations we can watch. Cable usually is an improvement. A cable operator receives both direct signals such as described as well as signals of many distant stations sent either by microwave or satellite. These then are sent to our home via cable connections.

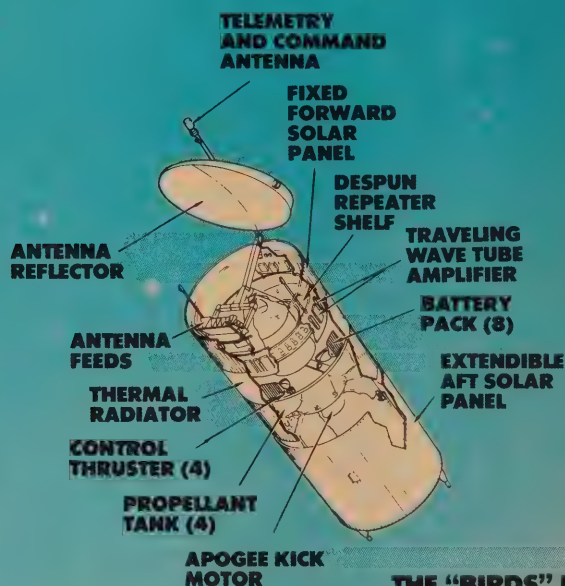
Satellite TV works best of all. With Satellite TV, we bypass the cable operator. We set up a dish antenna in our yard which receives TV signals directly from satellites out in space. (Remarkable as it may seem, these satellites are stationary relative to the earth, so it's fairly simple to aim a dish at them and keep them in "focus.")

Powerful TV stations send the signals to the satellite (called "uplinking"). The satellites receive them, then rebroadcast the signals back down to the earth. Because of their height, the signals, though weak, can cover an entire continent (the area of the earth the signal hits is called its "footprint").

That's why, no matter where we may be in the United States, when we aim a dish antenna at the satellites (there are currently 18 domestic "birds" in orbit) we can expect to get many signals or channels.

Once we've set up an antenna and are receiving a signal, it's piped to our house through wiring and then to a special receiver which allows us to view it on our TV set.

We can receive 24 channels per satellite (though all are not currently working or are not devoted to TV) and by moving our dish horizon to horizon, pick up other signals from other birds. Currently that means over 117 channels! ✎



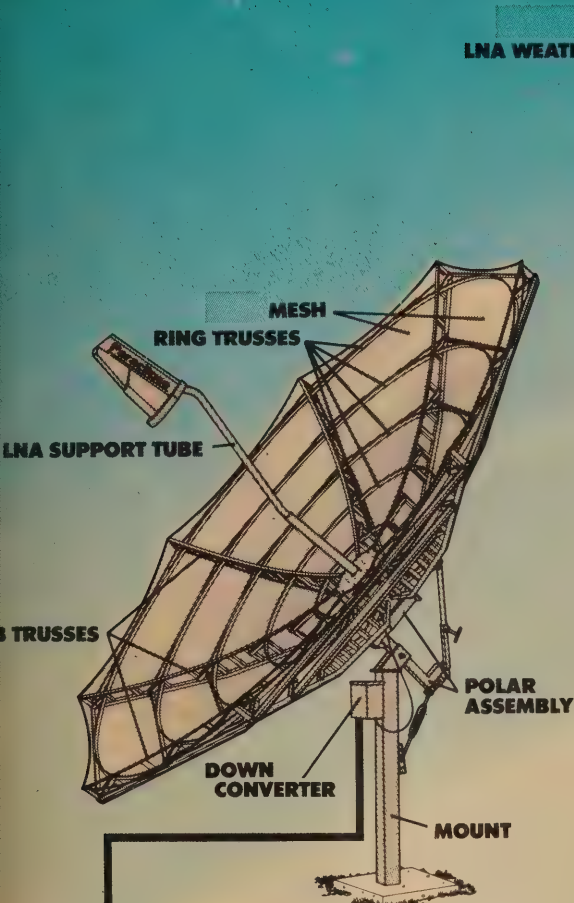
THE "BIRDS" IN SPACE

Arthur C. Clarke (2001: A Space Odyssey and 2010: Odyssey Two) first surmised that a satellite could be launched into an equatorial orbit where the pull of gravity would just be offset by the speed of the vehicle. From earth, the satellite would appear to "hang suspended" without moving, 22,300 miles high. From such an altitude a TV signal broadcast down could cover enormous areas such as the entire United States.



FROM BROADCASTER TO SATELLITE

It's called "uplinking" and refers to the signal sent from a powerful TV station to a satellite. The "bird" receives the signal, then rebroadcasts it to you.



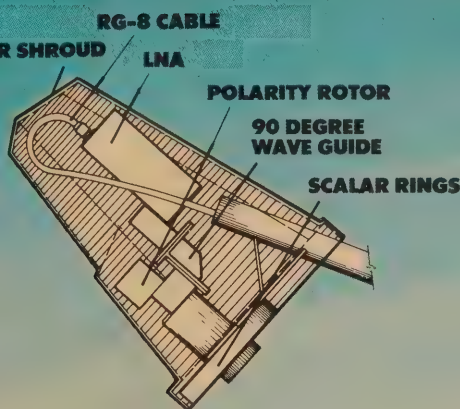
YOUR ANTENNA

A parabolic reflector that you set up in your back yard. It's not the actual antenna, it just captures the signal and focuses at its center. The antenna is a tiny device at the center with an amplifier.

SATELLITE RECEIVER

You need a special receiver to "translate" the satellite signal before you can see it. The receiver connects on-line before your TV.

PRIVATE EARTH STATION COMPONENTS



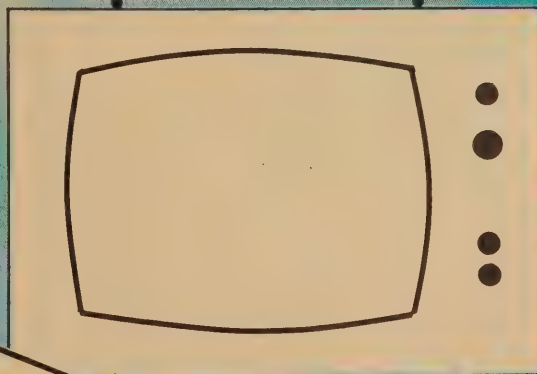
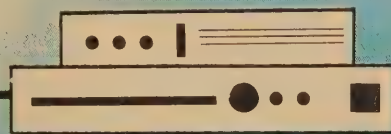
TUNED FEEDHORN ASSEMBLY

The LNA (Low Noise Amplifier), suspended at the center of your antenna, enormously amplifies the minute signal. Its power is measured by how little "noise" it adds. The lower the noise of the LNA, the better.

Illustrations courtesy of Paraclipse Corp.

ANTENNA POSITIONER

The latest luxury of satellite reception is the controller that activates a motor drive on your dish. A quick change of satellite is managed from within.



THE PICTURE

At the end of a satellite system, you can use any TV designed to be played in the United States. No special set required.

THE REMOTE

Most top line receivers offer a remote control. It should control both the receiver and the TV.



probably would settle generally upon a price at or below the price offered by this one small cable operator. But where the marketplace is not allowed access to the product through normal channels, competition does not exist and the price will not be a commercially reasonable price, but, rather, the highest price at which a significantly profitable portion of the market is willing to pay. HBO is preventing access to that marketplace.

This situation hopefully cannot last. Whenever profits are kept at an artificially high level, competition will find a way of moving in on the profit margin. Can HBO control and police the entire country? Or will satellite dealers and cable affiliates that are interested in servicing the existing TVRO market begin to get together to carve up the market and share in the sales? Can subsidiaries of the larger cable franchises set up to handle the home satellite market making use of the quantity discounts available to the larger cable systems to lower the price to a level acceptable to the dish owner? Cable companies that are not interested in the dish market may join forces with cable companies or satellite deal-

ers that do want to handle the TVRO subscription business and both will share in the revenues under licensing agreements or other arrangements, such as limited partnerships, mutually owned subsidiaries and so on.

The contracts which HBO has executed with the cable companies did not anticipate this situation and generally are silent on this issue. As a result, there is room for creative thinking in the franchised areas. It is rural America, the vast area which is not covered by cable affiliates that is held in HBO's grip.

Competition can bring down the cost of subscription services in the franchised areas. But HBO, if it is successful in preventing franchised cable affiliates from selling subscriptions to TVRO owners in non-franchise areas, can effectively disenfranchise rural America and prevent them from purchasing at a reasonable price.

HBO has given official reasons for its actions, but some of those who have followed the developments closely are of the opinion that each step the company has taken has tended to, and probably intended to, restrict access, restrict competition and support prices. As the states of Wisconsin and Illinois

have learned in the past, the courts look past the rhetoric and the labels that are put on an activity and examine the result of the activity. If the result violates the requirements of the law, it doesn't matter what you *call* your actions. Fair is fair and the existing situation is not fair to rural America.

Some sellers have considered selling subscriptions and decoders wherever they wish, simply lying to the signal suppliers about the location of the decoder. The M/A-Com system is not a global positioning system and cannot determine where the decoder box is located. Once the box is addressed, and as long as the bill is paid, the box can be operated anywhere in the country. This makes national marketing a possibility for any dealer if he is willing to practice a little deception. There may be a question of mail fraud involved in this scheme, as your postal authorities can inform you.

Certain entities have reportedly developed "black boxes" which can decode the signal and which can be sold at a reasonable price. They cannot be turned off by the programmer. These unauthorized decoding devices cannot be sold without violating the terms of the Cable Television Act of 1984. A violation can result in a fine of \$10,000 to the homeowner and \$50,000 to the dealer. You can't afford it.

Others have advised me that the selective removal or replacement of specified chips in the M/A-Com Videocipher after it has been addressed can render it incapable of being turned off by the programmer if the subscription remains unpaid. Whether this is true, I do not know. That it could result in being charged with theft of services, I am sure.

The proper way to address the scrambling issue is in the Congress and in the courts. The recent congressional hearings aired on C-Span indicate that our elected representatives are concerned that fair play prevail and that price-fixing and restraint of trade have a short life in the communications industry as a whole. So continue writing your senator and congressman. The use of HBO of a satellite system that was made possible by tax dollars to deny access to signal by the rural minority may be a violation of the 1st and 14th amendments.

If someone from Iowa or Arkansas offers a package deal on all scrambled stations at half the suggested retail, I'd be tempted. If I have a hoot about HBO, that is. ▀



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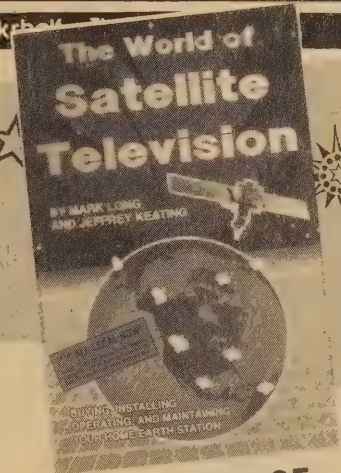
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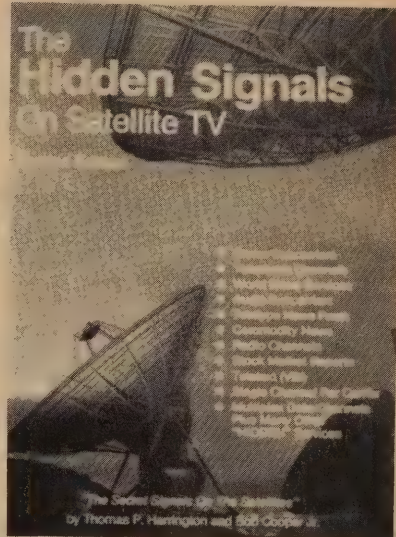
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SCPC Equipment
How to Receive SCPC
History of Data Communications
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Satellite Delivered Services
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Keyfax Service—Zenith System—plus more

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Commodity Communications Service
United Press International
PIN — Cabletext's Services
Other VBI Services — plus more

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Both antennas came through without so much as a piece of mesh bent or a clip missing. And we were naturally delighted.

But "deep down", of course, you always wonder if any test...however intense...can duplicate the real thing.

Now we know

When Hurricane Kate shrieked across the Caribbean last November, three of our stock Paraclipses in varying sizes were among a total of 22 dishes at Bob Cooper's West Indies Video (WIV) Test Site on Provo Island.

The WIV facility is also responsible for 15 additional "off site" antennas scattered throughout the Turk and Caicos Islands. And its reason for being there is to test performance...not storm survival.



But Kate could not have cared less.

It was as if Hurricane Kate took dead aim at the Provo Test Site, slamming directly into it... battering its antennas from front, side and back with the first 100 mph winds the area had seen since 1960.

Of the 37 antennas at the test site and nearby locations, only two survived the 4 1/2 hours of Kate's hammering with no damage whatsoever. Both were Paraclipse antennas... one was the new nine foot (2.8m) Cog Drive model (CD), the same kind you might find in use at any home, anywhere; the other a 16 foot (4.8m) antenna, our senior, commercial service antenna.

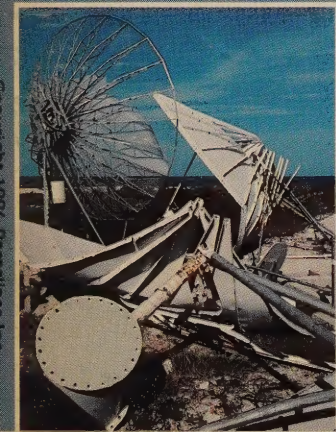
Several Paraclipse antennas survived with only minor damages due to motor drive failures.

In the accompanying photographs, you will see antennas utilizing various designs and materials. All of the antennas were equally exposed. None of the photos have been retouched except to delete specific logos.

Hurricane Kate proved that only the fittest will survive. Paraclipse.

All Paraclipse antennas are Ku-band compatible.

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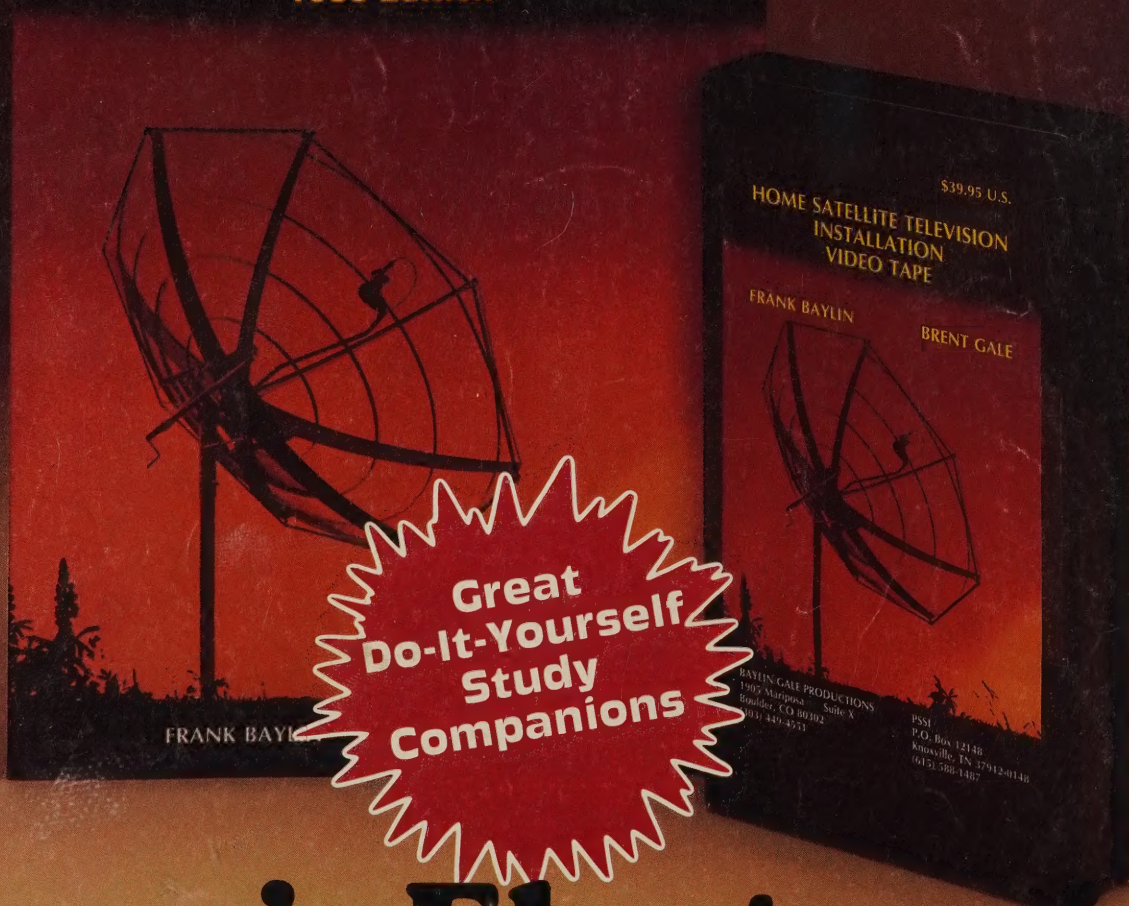
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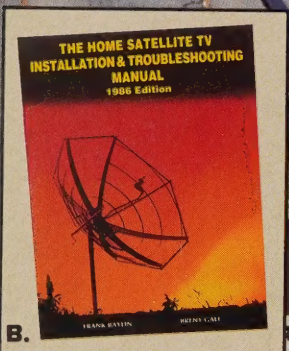
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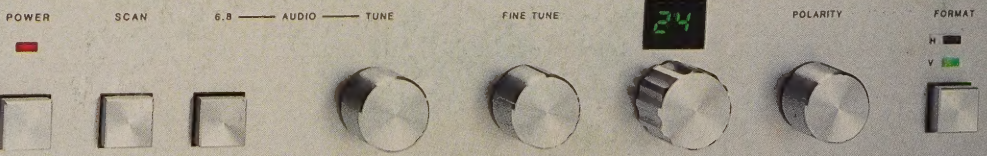
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